BULLETIN 419 MAY, 1928

Livestock Production Costs in Greene County, Ohio

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OHIO
AGRICULTURAL EXPERIMENT STATION
Wooster, Ohio

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LIVESTOCK PRODUCTION COSTS IN GREENE COUNTY, OHIO

JOHN F. DOWLER

The cost data used in this study were taken from records collected from 25 different farms in the vicinity of Cedarville and Jamestown in Greene County, Ohio, during the five years 1920-1924.[1] The farms fairly represent the present general plan of farm organization and operation in effect in the west-central section of the State. The farming practices of the area have evolved from past experiences and circumstances and form a rather stable type of agriculture.

Fig. 1.—This study was carried on in Greene County in the vicinity of Cedarville and Jamestown

It is the aim of this bulletin to set forth the comparative costs of production by the various methods in use on these farms for the several livestock enterprises, as a means of studying the weaknesses and strong points of such practices as are being used in livestock production today; and at the same time to give an idea of the relative magnitude of the different factors that enter into the cost of production of livestock; and to suggest methods to increase or decrease the volume of such factors for a more efficient production.

[1]This project was conducted jointly by the Department of Rural Economics of the Ohio State University, the Ohio Agricultural Experiment Station, and the Division of Farm Management and Costs, Bureau of Agricultural Economics of the United States Department of Agriculture. The following farmers, in the vicinity of Jamestown and Cedarville, cooperated in furnishing the data:

Anderson, William
Bailey, H. S.
Cherry, William J.
Clemans, Fred
Dobbins, Fred
Ewbank, N. P.
Finney, E. E.
Franklin, C. B.
Franklin, J. C.
Geary, A. F.
Johnson, Frank
Jones, H. N.
Kyle, D. M.
Lackey, Frank
McCampbell, J. A.
McElroy, Currie
McElwain, Burton
Mott, C W.
Murphy, C W.
Paullin, D. E.
Phillips, O. M.
Smith, Floyd
Stormont, Meryl
Turnbull, Hugh
Williamson, Collins
Williamson, Fred

The route method was used in collecting the data. Each farm was visited at least once a week by a field man and complete farm cost records were secured. By his frequent visits ample opportunity was given to check the accuracy of the records. During the period 25 farms were included in this study—11 for the entire five-year period 1920-1924, 6 for four years, 2 for three years, 2 for two years, and 4 for one year.

PRESENT TYPE OF FARMING

Livestock enterprises.—The major portion of the farm business on these farms was the care and feeding of livestock. Income from livestock formed 72 percent of the total farm receipts. The relative importance of the different kinds of livestock kept is shown in Table 1.

TABLE 1.—Relative Size of Livestock Enterprises as Shown by Percent of Total Income, Annual Net Increase, Total Animal Units, and Number of Breeding Stock—Averages of 20 Farms, 1920-1924

Enterprise	Proportion of total income	Annual average per farm		
		Net increase*	Total animal units	Breeding stock
	Pct.	*Dol.*	*No.*	*No.*
Swine	44.7	722.36	18	15
Cattle	15.0	578.52	10	6
Poultry	6.0	229.98	1.5	105
Sheep	5.9	225.44	3	20

*The net increase of any livestock enterprise is the difference between the sales and purchases, plus the increase (or minus the decrease) in value of the inventory and plus the value of products used by the household from that particular class of livestock.

The raising of hogs formed the most important enterprise, from which, on the average, 50 percent of the farm receipts were secured. The system of raising two litters a year was generally followed. The sows were kept thruout the year and as their usefulness diminished they were fattened for market. Purebred stock was kept on most of the farms.

Receipts from cattle formed the second largest livestock item of farm income. These herds were principally of the dairy type and the sale of cream furnished the major receipts. Three farms had beef herds, from which most of the increase was sold to local butchers, and one of these farms also shipped in feeder cattle for winter feeding. Only a few herds were purebred, which was typical of this area. Most of the herds were grades and crosses of various breeds.

Flocks of sheep were kept on three-fourths of the farms. Some were of the fine-wool type kept mostly for wool, while others were of the mutton type kept for the increase in lambs. No flocks of wethers were kept.

Poultry formed a minor source of income. Most of the flocks were small and were cared for by the housewife or children of the family.

Cropping practice.—With livestock enterprises forming a large part of the farm business, these farmers followed the practice of growing the major portion of the feed to be consumed by the livestock. The average area of the farms was 162 acres, of which 137 acres was in rotated crops and 10 acres in permanent pasture. The rotation most commonly followed was a three-year rotation of corn, wheat or oats, and clover and timothy mixed.

Corn was the main crop grown and occupied 37 percent of the rotated crop area, or 51 acres per farm. It was raised primarily for feeding livestock, mainly hogs, and only a few farms made a business of selling any of the grain.

Wheat was used almost entirely as a cash crop, only small amounts being fed to livestock. Wheat fits into the rotation following corn that is cut, and it is a very desirable nurse crop for young clover and timothy. Wheat was sown on 20 percent of the crop area, or an average of 27 acres per farm. Oats were grown usually in corn-ground from which the corn was husked from the stalk or hogged down. The grain was fed to livestock on most of the farms. Where oats were the only small grain grown a portion was usually sold. The oats acreage averaged 13 acres per farm, or 9 percent of the crop area. A mixture of clover and timothy was the principal pasture and hay crop. Some farms had bluegrass pasture, and also a small woods that was usually good for sheep pasture part of the year. Rye, soybeans, alfalfa, and miscellaneous crops were grown in small amounts for feed. Some of these crops were seeded when other crops failed or they were used to supplement the usual crop grown.

Income and its sources.—The period of the study was years of low profits in agriculture. In only two of the five years was there a cash balance after paying farm operating expenses and interest on the capital invested. For the group as a whole during the five-year period the farm income averaged $1,090.66, or, if interest on the total capital at 4 percent had been deducted from this, an average family labor income of $170.56. The family labor incomes ranged from $943.49 to minus $835.08 for the period, as shown in Table 2.

TABLE 2.—Variations in Annual Family Labor Income, Percentage of Income From Different Sources, and Returns per Dollar's Worth of Feed Consumed by Livestock, by Farms, 1920-1924

Farm	Annual family labor income*	Sources of income						Return per dollar's worth of feed			
		Net increase from:				Crop sales	Other receipts	Hogs	Cattle	Sheep	Poultry
		Hogs	Cattle	Sheep	Poultry						
	Dol.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
20	943.49	25.0	41.9	7.9	10.0	10.2	5.0	0.71	1.61	2.84	2.35
2	893.66	74.1	7.9	.5	7.0	7.3	3.2	1.52	1.37	.82	3.60
4	727.78	43.2	13.4	8.7	4.0	24.3	6.4	1.04	1.13	1.78	2.61
15	661.78	25.5	29.3	10.0	3.3	24.0	7.9	.94	1.95	1.88	3.27
6	601.23	42.1	26.5	8.2	7.9	12.6	2.7	1.12	1.96	1.49	2.45
5	472.86	20.7	13.7	.....	4.6	44.2	16.8	.92	1.55	.....	2.17
8	440.06	34.7	19.2	6.4	3.0	34.8	1.9	1.02	2.08	1.86	5.54
16	303.81	56.3	20.6	.....	7.7	14.7	.7	1.20	2.41	.....	3.84
10	206.36	26.3	12.9	0	6.3	48.3	6.2	1.00	2.56	0	7.27
12	72.12	51.0	8.0	6.3	6.1	18.9	9.7	1.24	1.46	2.83	2.76
13	7.30	60.7	4.5	6.9	1.8	25.4	.7	1.59	.36†	1.64	2.57
3	—15.46	48.1	22.5	8.9	11.5	6.5	2.5	1.02	1.25	1.76	2.03
9	—61.52	32.6	14.1	5.0	12.4	33.7	2.2	1.05	1.34	1.40	1.13
7	—152.48	43.2	9.6	13.2	12.1	18.8	3.1	.95	1.57	1.54	3.70
14	—203.63	48.7	16.9	.8	5.7	23.6	4.3	.90	2.32	1.36	2.39
18	—220.73	53.2	6.6	17.6	3.9	11.7	7.0	1.09	.40†	2.38	2.75
17	—337.72	46.8	20.6	3.9	3.7	20.5	4.5	1.17	1.67	2.02	3.84
1	—555.24	38.7	9.0	3.0	3.6	32.2	13.5	1.15	.21†	1.37	3.19
19	—758.77	25.4	34.1	3.2	9.3	15.9	12.1	.38	1.70	1.47	5.50
11	—835.08	41.2	15.2	7.8	5.4	29.2	1.2	.99	1.17	2.10	2.74
Average	170.56	44.7	15.0	5.9	6.0	23.0	5.4	1.13	1.61 .36†	1.89	2.77

*Family labor income was secured by subtracting 4 percent interest on total capital investment from the farm income.
†These were beef cattle herds; the major receipts from all other herds were from the sale of dairy products.

Variation of income.—Fluctuation in the prices received for their products was the chief reason for the wide variation in income from year to year on this group of farms.

TABLE 3.—Farm Income and Family Labor Income, Average for Five Years and Yearly Average of 20 Farms, 1920-1924

Item	Average 5 years	1920	1921	1922	1923	1924
	Dol.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Farm income	1090.66	87.16	458.03	2008.18	574.15	2110.09
Interest on capital, 4%:	920.10	863.81	854.88	949.12	942.40	975.88
Family labor income	170.56	—776.65	—396.85	1059.06	—368.25	1134.21

During the years 1920 and 1921 prices were declining, as shown in Figure 2. From June, 1920 to August, 1921, wheat prices dropped 157 points. Non-agricultural prices did not drop so fast. The farm income was low during 1920 and 1921 because of the decreasing inventory and declining receipts from farm products, while expenses did not fall as fast.

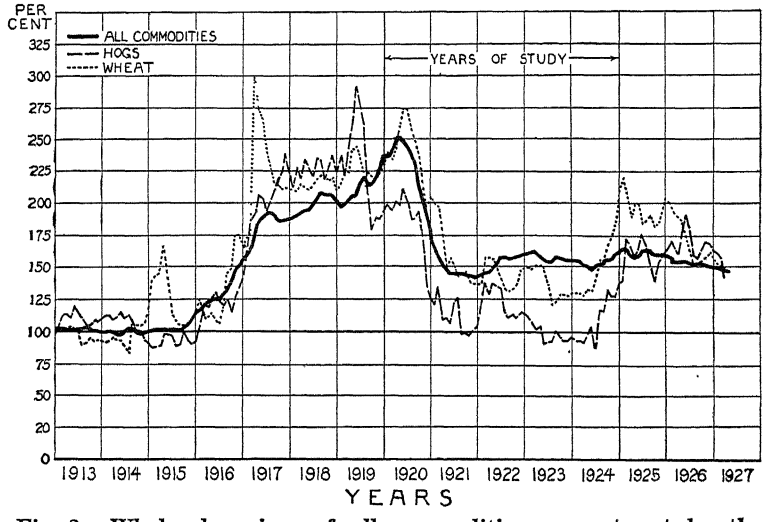

Fig. 2.—Wholesale prices of all commodities, as put out by the Bureau of Labor Statistics, compared with the Ohio price of hogs and wheat. The average for the years 1910-1914 has been used as a base of 100

During 1922 the price of hogs and wheat recovered somewhat from the low points of the previous year. As about three-fifths of the farm receipts came from the sale of hogs and wheat, this greatly increased the farm income for that year.

In 1923 hog and wheat prices declined to a new low level, and farm incomes were again low. A rapidly rising market for hogs and wheat in 1924 increased farm incomes for that year.

The farm receipts were affected by crop yields as well as by the fluctuation in prices of other farm products than hogs and wheat. The period of this study, 1920-1924, includes a few months of peak prices, the deflation period, or 1½ years of rapidly declining prices, and more than 3 years of low farm prices.

FACTORS OF COST

In this study an effort was put forth to make the work applicable to future conditions as well as to the past, by giving both the material amount and the value of such cost factors as feed, man labor, and horse work. Such cost factors as veterinary, buildings, equipment, overhead, taxes, insurance, and interest can only be expressed in money value.

Feed and pasture.—Feed is the largest single item in the cost of producing the livestock. Values used for home-grown feeds are the local farm market prices for the month during which they were fed. Grinding is considered as an added cost to the feed. Corn, hogged down or fed unhusked in the fodder, is valued at the price of crib corn less the cost of husking and cribbing. Purchased feeds are listed at the price paid, and the time required for hauling them to the farm is added to the labor account. Pasture costs were arrived at by charging prevailing rental rates per animal-unit-month for which they were on pasture. This rate was modified according to the abundance or scarcity of edible grass and in proportion to the amount of other feed received. The average monthly rate for the five-year period was $2.10, or 7 cents a day per animal unit.

For the purpose of this study an animal unit has been considered the equivalent of 1 horse, 2 colts, 1 cow, 1 bull, 2 yearlings, 3 calves, 5 sows, an increase of 1400 pounds live weight of pork, 7 to 10 sheep, or 100 chickens.

Man labor and horse work.—The cost of hired labor is the cash wage plus the value of other considerations received. All labor of the operator is charged at 30 cents per hour, which is an average of 10 percent above that of all hired labor. This increase is merely to compensate for a higher class of labor and in no way to act as payment for the farmer's managerial ability.

The rate used for horse work is the total cost for the year divided by the number of hours worked, as calculated for each farm. The average cost of horse work on all farms from 1920 to 1924 was 16.3 cents per horse-hour.

Other cost factors.—The use of buildings and equipment charges include repairs, upkeep, insurance, taxes, depreciation and interest. The total building charge was apportioned among the various uses of the buildings.

Taxes as they appear in the tables are only that portion of chattel taxes prorated to livestock. No real estate taxes are shown as such. Real estate taxes on building valuations enter into building costs and consequently are also a small part of the equipment charges and horse work costs.

Interest on the beginning inventory of livestock at the rate of six percent is listed as a separate item. It was included in this cost study so that comparative costs of livestock enterprises could be secured.

Miscellaneous and special cost items will be explained as they appear in the enterprise costs.

COST OF LIVESTOCK PRODUCTION

The cost of producing any unit of livestock or livestock products on each of a group of farms will show a wide range of variation. The management, care and feeding practices will differ. Some farms will have better arranged buildings and equipment to facilitate the feeding and care of livestock. Even the animals themselves will differ as to their ability to produce livestock products economically. By studying the variation in cost on a group of farms, which shows the amount of the main cost factors, some of the causes of high or low cost in production can be seen. That part of cost variation from year to year due to change in prices of feeds cannot be controlled to a great extent by the manager. If a manager consistently produces livestock products cheaper than his neighbor for a period of years, the cost factors and practices involved that are responsible for this difference are well worth studying and should point to methods and means of improving the production of the high-cost neighbor and others in the same situation.

HOGS

RETURNS FOR PORK PRODUCTION

Farm-to-farm variations.—On 14 farms the return from hogs more than covered the cash and salable cost of production. Cash and salable costs include all feed, veterinary charges, taxes, and insurance. For all the farms the variation in return above cash and salable cost ranged from $3.60 to minus $4.34, with an average $1.16 above the costs as shown in Table 4.

TABLE 4.—Pork: Variations in Cost of Production and Returns, by Farms, 1920-1924

Farm	Received per bushel of corn	Return* per dollar's worth of feed and pasture	Per 100 pounds of pork				
			Cost			Return	
			Total	Non-salable†	Cash and salable‡	Total	Above cash and salable cost
	Dol.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
2	0.95	1.52	8.77	2.25	6.52	10.12	3.60
13	.80	1.59	6.60	1.68	4.92	8.23	3.31
12	.54	1.24	9.39	2.72	6.67	8.59	1.92
17	.44	1.17	10.10	3.20	6.90	8.55	1.65
16	.53	1.20	8.58	2.66	5.92	7.47	1.55
1	.53	1.15	8.87	2.55	6.32	7.76	1.44
4	.43	1.04	10.63	3.31	7.32	8.13	.81
6	.65	1.12	9.88	2.48	7.40	8.21	.81
9	.65	1.05	9.42	1.84	7.58	8.21	.63
3	.29	1.02	10.83	3.80	7.03	7.64	.61
18	.49	1.09	9.46	1.92	7.54	8.00	.46
10	.38	1.00	11.20	3.14	8.06	8.39	.33
8	.59	1.02	9.97	2.35	7.62	7.92	.30
11	.49	.99	10.36	2.30	8.06	8.25	.19
15	.32	.94	9.91	2.81	7.10	7.04	—.06
7	.38	.95	10.75	2.70	8.05	7.83	—.22
5	.14	.92	13.85	5.31	8.54	7.99	—.55
14	.04	.90	9.28	2.84	6.44	5.79	—.65
20	.02	.71	13.27	4.25	9.02	6.59	—2.43
19	—.74	.38	15.02	7.86	7.16	2.82	—4.34
Average...	.49	1.13	9.72	2.76	6.96	8.12	1.16

*Returns include increase in inventory, value of pork used by household, and sales less purchases.

†Nonsalable costs include pasture, man labor, horse work, building and equipment charge, interest, and overhead charge.

‡Salable costs include feed, veterinary charges, taxes, and insurance.

On only two farms out of twenty was the income from pork production sufficient to cover all assignable costs for the period during which records were collected. The data do not show that this situation was wholly caused by the producton methods employed but that it was greatly affected by the fluctuation in prices of both hogs and feed. The average Ohio farm price of hogs was $15.59, $8.39, $9.12, $9.48, and $8.50 per hundredweight for the years 1920 to 1924, respectively.

The income from the hog enterprise expressed as the return per dollar's worth of feed and pasture required, ranged from $1.52 to 38 cents, with an average for all farms of $1.13. As the return per dollar's worth of feed increased, the return above cash and salable costs became greater.

When all costs of pork production, with the exception of that of corn, were balanced against the return, all farms, except No. 19, received some return for the corn. The amounts received per per bushel of corn, on the remaining farms ranged from 2 to 95 cents, with an average on all farms of 49 cents. Farms 2 and 13 received 21 and 22 cents per bushel, respectively, more for their corn than the average price at which the corn was valued at the time it was consumed. Some of the factors which influenced the cost of production and the amount of profits from the raising of hogs will be set forth in the following discussion.

COST OF PRODUCING PORK

Variations from year to year.—The variation in the average cost of producing pork for the different years, as shown in Table 5, ranged from $13.06 in 1920 to $7.36 in 1921. This was largely due to variations in the price of feed. As the price of corn increased from 1921 to 1924, the cost of producing pork increased. This close correlation exists because the single item of corn formed more than 57 percent of the total cost of producing pork.

TABLE 5.—Pork: Variations in the Items of Cost of Production, Averages of All Farms for the Years 1920 to 1924

Item of cost	Cost per 100 pounds					
	Average	1920	1921	1922	1923	1924
Number of farm records...	87	13	18	19	20	17
Price of corn per bu., dollar	.68	1.01	.43	.56	.68	.89
	Dol.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
Feed	6.61	9.84	4.34	5.33	6.94	8.57
Pasture	.60	.73	.52	.53	.64	.63
Man labor	1.15	1.05	1.14	1.12	1.19	1.21
Horse work	.11	.15	.10	.11	.09	.10
Veterinary	.28	.36	.23	.30	.29	.22
Buildings	.16	.16	.15	.15	.18	.17
Equipment	.15	.08	.18	.15	.16	.17
Overhead	.27	.22	.28	.27	.28	.27
Taxes, insurance	.07	.06	.06	.07	.08	.09
Interest	.32	.41	.35	.29	.28	.30
Total	9.72	13.06	7.36	8.32	10.15	11.74

Causes for farm-to-farm variations.—The variation in cost of producing pork on the different farms, as shown in Table 6, ranged from $6.60 to $15.02 per hundred pounds of pork. The weight of pigs sold, butchered for home use, and retained for the breeding herd, as well as the increase in weight of the breeding herd, was considered as marketable pork produced. All costs in this study are expressed in terms of marketable pork produced. The costs shown in Table 6 are not merely the cost of fattening pigs for market but include the cost of maintaining the breeding herd and all costs of growing and fattening the pigs until they were ready to leave the farm for market. No marketing cost is included in this study.

TABLE 6.—Pork: Variations in Cost of Production, by Farms, 1920-1924

Farm	Total pork produced	Cost per 100 pounds										
		Feed	Pasture	Man labor	Horse work	Veterinary	Buildings	Equipment	Overhead	Taxes and insurance	Interest	Total
	Lb.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
13*	128,617	4.58	0.59	0.37	0.03	0.24	0.13	0.01	0.12	0.10	0.44	6.60
16	93,394	5.69	.53	1.30	.13	.19	.09	.07	.28	.04	.26	8.58
2	283,207	6.22	.43	.81	.13	.23	.27	.13	.15	.07	.33	8.77
1	104,828	5.97	.79	.83	.05	.30	.12	.19	.25	.05	.32	8.87
14	93,905	5.96	.50	1.34	.19	.40	.13	.14	.18	.08	.35	9.28
12	125,505	6.41	.53	1.05	.15	.19	.12	.36	.31	.07	.20	9.39
9†	43,980	7.36	.48	.79	.06	.15	.12	.03	.13	.07	.23	9.42
18	121,840	7.16	.45	.81	.10	.32	.18	.19	.17	.06	.20	9.64
6	56,410	6.60	.76	1.41	.04	.49	.08	.11	.10	.08	.21	9.88
15	67,412	6.72	.73	1.15	.07	.32	.14	.11	.30	.06	.32	9.91
8	101,054	7.09	.67	.88	.05	.46	.14	.11	.27	.07	.22	9.97
17	93,002	6.55	.76	1.24	.07	.28	.28	.19	.33	.07	.34	10.10
11	93,282	7.86	.50	.99	.07	.14	.19	.15	.11	.06	.29	10.36
4	101,604	7.05	.73	1.59	.14	.20	.06	.08	.41	.07	.30	10.63
7	107,662	7.49	.73	1.06	.13	.41	.09	.11	.19	.15	.40	10.75
3	64,962	6.78	.68	1.95	.15	.20	.11	.16	.49	.05	.26	10.83
10	56,018	7.79	.57	1.19	.13	.23	.32	.19	.42	.04	.33	11.20
20	37,920	8.54	.76	2.26	.09	.40	.10	.22	.51	.08	.31	13.27
5	39,310	8.16	.58	3.29	.15	.32	.08	.09	.66	.06	.48	13.85
19	31,917	6.66	.77	3.29	.28	.29	.38	.73	1.46	.21	.95	15.02
Av.	1,845,829‡	6.61	.60	1.15	.11	.28	.16	.15	.27	.07	.32	9.72

*Raised only a spring litter of pigs each year.
†No sows were kept. Shoats were purchased and fattened.
‡Total pork produced by all farms.
Note: Four-year records were collected on farms 12, 13, 14, 15, 16, and 17.
Three-year records were collected on farms 18 and 19.
Two-year records were collected on farm 20.
Five-year records were collected on the remaining eleven farms.

The customary practice in this section was to raise two litters of pigs a year and to feed each litter until ready for market. Sows were kept from year to year and fattened for market when their usefulness seemed to be past. Among the farms included in this study there were two exceptions to the cutomary practice. Farm 9

had no sows during the five years records were collected, but bought feeders ranging in weight from 90 to 150 pounds and fattened them for market. The feeders were bought in small lots from farms in that general vicinity.

Farm 13, with the lowest cost of producing pork, followed the practice of raising one litter annually and keeping the sows thruout the year. During the winter the sows received some of their corn unhusked, or as shock corn. Some alfalfa was fed to the sows in cold weather, but very little, if any, other supplementary feed. In the fall and winter the sows were allowed to run over a sod field that was to be plowed in the spring. They were kept in good condition but not fat. The pigs were farrowed late in March or April, so that they could be on bluegrass pasture at once. Each sow had an individual coop with no floor and little bedding. The pigs were allowed to follow the sows until they were naturally weaned. Plenty of mixed clover and timothy pasture was available all summer. A small amount of corn was fed to the pigs during the summer, but the sows received very little grain. The pigs were immuned for cholera when two months old. They had access to an open ditch for water. In the fall the pigs were turned into part of a corn field as soon as the corn began to ripen. As much as possible was hogged off before wheat sowing time. Then unhusked corn in the fodder was the main feed until the pigs were ready for the market. The hogs on this farm were usually marketed in January and February and were of somewhat heavier weight than those on most of the other farms studied. The aim was to let the hogs harvest the corn crop and carry it to market with the least possible amount of human labor. The amount of man labor and horse work required on Farm 13 was the lowest of any in this group of farms (Table 6). The costs on this farm were also kept down because of low feed cost. Farm 13 had a good volume of business, which tends towards economical production. An average of more than 32,000 pounds of pork was produced each year. This system of management has been successful on this farm for a number of years. The manager has greatly reduced the man labor required in the harvesting of his corn crop as well as the growing of his hogs. The extra labor of carrying the slop bucket and special care necessary to raise fall pigs were eliminated. The feed cost of maintaining the breeding herd per hundred pounds of pork produced was lower on this farm than the average of the group of farms, as will be shown later. A purebred breeding herd was maintained thruout the four years.

Farm 2 had a relatively low cost of production and followed the system of two litters of pigs a year. The sows were kept in herds of 10 or 12 in a grass lot with 3 or 4 sows to a house for sleeping quarters. These houses were movable, and contained floors. The breeding herd was kept in good condition at all times. Their main feed consisted of corn, oats, tankage, and oil meal, with salt and mineral feed before them while carrying pigs. Ground feed was mixed into a slop and fed for at least two weeks before farrowing and until the pigs were weaned. Each of these portable houses accommodated two sows at farrowing time. For several days they were penned separately then the center partition was removed and each sow had the accommodation of the whole house, about 8 by 10 feet in size. These houses were always located on new pasture each spring and fall to prevent the spread of disease to the pigs from contaminated ground. The houses were kept clean and were aired. Very few losses occurred at farrowing time. The sows were fed generously after the first week, and as soon as the pigs were big enough to eat they were given access to a self-feeder which the sows could not reach. At the end of about eight weeks the "sows were weaned away" from the pigs. The pigs remained where they were accustomed to sleep and eat. Thus there was no delay in their growth. The sows were fed heavily for two weeks before breeding; had the run of a good size field for pasture in summer and for exercise in winter; and were never penned up in small lots for any length of time.

The pigs on this farm were well fed at all times with supplementary and mineral feeds in self-feeders, corn being fed by hand. All pigs were immuned against cholera and in some years were treated with santonin capsules for worms. The pigs were kept in herds of about 50, and had portable houses for sleeping quarters supplemented with sunshades in summer. Plenty of water was provided at all times in portable drinking fountains, which were kept from freezing in winter with kerosene lamps. The pigs were kept contented and thrifty at all times. The spring pigs harvested as much new corn as they could in the fall before they were sold in September. The pigs were sold when they weighed around 200 pounds and at that time were about six months old. The fall pigs were sold in March at about the same age. The aim was to have the pigs come at such a date that they would be ready for the market at the times when prices were usually highest during the year. The volume of business was quite large, with an average annual output of more than 56,000 pounds, which tends toward

economical production. Feed costs were low, not because of low priced feeds but because of good management and care in feeding to produce the greatest possible gain from the feed consumed. The labor requirement was low because of the use of self-feeders, water fountains, and practical houses and equipment for the care of the herd. Purebred animals were used entirely for the breeding herd, but part of the time a boar of another breed was used and the resulting offspring were very thrifty and made economical gains.

Farm 12 followed the practice of raising two litters of pigs annually and had a relatively low cost of production. The pigs were farrowed in March and August or September. The sows were kept in a fair condition with little or no feed supplementary to corn. Some tankage was fed during the month before farrowing. Special care and attention were given at farrowing time. Each sow was penned separately in a small lot, with an individual portable coop. Some of the coops had floors and others had no floors. Each year the coops and pens were moved to fresh ground or pasture where hogs had not been raised since the ground was plowed. Most of the losses occurred at farrowing time, either from the pigs' being too weak or the sow's lying on them. The pigs became accustomed to eating corn and tankage from a self-feeder before they were weaned. The sows received no tankage, if grass were available, and very little corn during the summer. The feed to the pigs was increased by hand feeding in addition to the self-feeder. No slop and very little mill feeds were fed to any of the herd. The pigs always had the run of a good sized field for pasture in summer and exercise in winter. Corn was hogged down two years out of four. Low cost of production was due to careful and thoughtful feeding with very few losses of pigs after weaning. An average of over 31,000 pounds of pork was produced annually.

The farms that were the most successful in the production of pork seemed to have a number of managerial practices in common, which resulted in the lower cost of production. The sows were well fed before farrowing. Separate houses or coops were provided for each sow and these were always placed on new ground or pasture each farrowing season. The young pigs were kept away from straw stacks and feed lots about the barn and other buildings. The run of large fields was given to the growing pigs for pasture in summer and exercise in winter. As much corn as possible was hogged down. Labor was also saved by the use of self-feeders, and the feeding of unhusked corn in the fodder. Plenty of drinking water was provided at all times and kept from freezing in the

winter. Preventive measures were taken against cholera and treatments were given for the round worm. The pigs were given comfortable quarters and were kept thrifty and well contented from the start.

The practices of the group of farms with the highest unit cost of pork production were somewhat different from those of the farms with low cost. As a group they were less efficient in their feeding and care, with greater labor requirements and larger amounts of feed consumed per unit of gain. The sows were often too fat or too poor. Straw stacks, stables, or other unsuitable and unsanitary places were often provided for the farrowing sow. Most of the pigs were fed around the barn and in feeding lots which could not be plowed. Quite a number of pigs were lost at farrowing time and the number was increased between weaning and marketing. The average number of pigs saved per litter was 3 for the group of five farms with the highest costs in Table 6. All of them immuned at times for cholera but some were not regular in the practice. Other swine diseases and ailments were prevalent. These losses increased the feed cost which those pigs that were marketed had to bear. Much time and labor were required for the same reason, and also because of inefficient methods of management, such as: little use made of self-feeders; very little corn hogged down; water carried to the hogs; and houses and equipment so arranged that much labor was necessary to care for a few hogs. Other points of differences will be brought out in later discussions.

The variations in total costs from farm to farm were influenced largely by the amount of feed consumed, as shown in Figure 3. Labor cost varied to some extent but not as much as feed, except on the last five farms. Other costs per hundred pounds were about the same on all farms with the exception of the last four, where there was an increase. On the five farms with the highest cost of production, labor and other costs formed 36 percent of the total cost, as compared with an average of 27 percent on the five farms with the lowest cost. The farms with high costs were more inefficient with labor than with feed.

Relative size of cost items.—Feed was by far the largest cost item in the production of pork, as shown in Table 7. Feed and pasture together formed 74.3 percent of the total cost. The next largest item was man labor, which formed 11.7 percent. This amount of labor includes the time required to care for the sows, pigs, and shoats until they were ready for the market. Such

operations as hauling feed, water, and bedding for the hogs and other special work as well as the regular chores or feeding were included in these data.

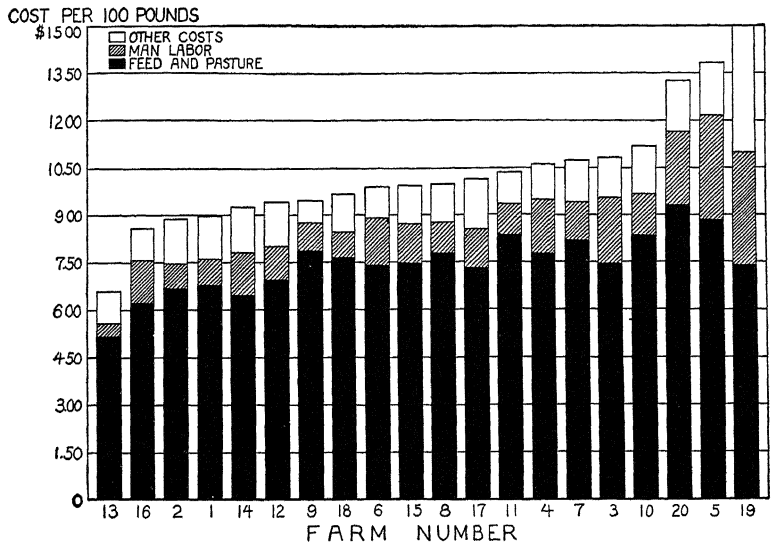

Fig. 3.—Comparison of feed, labor, and other costs of producing 100 pounds of pork on 20 Greene County farms, 1920-1924

Interest on the breeding herd forms the next largest item of cost, with veterinary and overhead charges following closely in amounts. Veterinary services, serums and medicines formed an important cost item, which has possibilities of being reduced. Various ailments, other than cholera were present among the herds, which undoubtedly increased the cost of pork production more than did the veterinary or medicinal charges.

TABLE 7.—Pork: Percentage Division of the Cost Items of Production for the Years 1920 to 1924

Item of cost	Division of cost					
	Average	1920	1921	1922	1923	1924
	Pct.	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*
Feed	68.0	75.3	59.1	64.1	68.4	73.0
Pasture	6.3	5.6	7.1	6.4	6.3	5.4
Man labor	11.7	8.1	15.5	13.5	11.7	10.3
Horse	1.1	1.1	1.4	1.3	.9	.9
Veterinary	2.9	2.8	3.1	3.6	2.9	1.9
Buildings	1.7	1.2	2.0	1.8	1.8	1.4
Equipment	1.5	.6	2.4	1.8	1.6	1.4
Overhead	2.8	1.7	3.8	3.2	2.8	2.3
Taxes and insurance	.7	.5	.8	.8	.8	.8
Interest	3.3	3.1	4.8	3.5	2.8	2.6
Total	100	100	100	100	100	100

Interest and taxes on land used for feeding lots and yards that did not enter into crop rotation have been included in the overhead charge. This charge also includes various general farm expenses which have been divided among the different enterprises.

The use of buildings and equipment each forms less than 2 percent of the total cost of pork production. Repairs, depreciation, interest, taxes, and insurance make up these charges. A portion of a barn or shed, as well as portable coops, was often used for sheltering hogs. Equipment included such articles as self-feeders, water fountains, troughs, hurdles, panels, portable hog fences, oilers, cookers, and other minor equipment.

Taxes and insurance on the herd formed less than one percent of the total cost.

Unit cost of production.—The average quantities of the different feeds consumed per hundred pounds of marketable pork produced are shown in Table 8. Corn was the most important grain fed. It formed 87 percent of the total weight of dry feed and over 57 percent of the total cost of pork production. Corn hogged down or fed unhusked was charged at a lower rate than cribbed corn as previously explained. With 17 percent of the corn hogged down, and since a large portion of the corn was fed in the fall when it is naturally cheap, the average price was lower than a straight monthly average price.

TABLE 8.—Average Quantity and Value of Cost Items in the Production of 100 Pounds of Marketable Pork on 20 Farms, 1920-1924

Item of cost	Amount	Value	
		Per unit	Total
		Dol.	*Dol.*
Feed;			
Corn....Bushels..	8.2	0.68 per bu.	5.57
Oats....Bushel..	.5	.46 per bu.	.23
Other grains....Pounds..	5.9	1.87 per cwt.	.11
Tankage....Pounds..	9.1	3.02 per cwt.	.28
Skim feed....Pounds..	20.9	.35 per cwt.	.07
Other protein....Pounds..	1.8	2.91 per cwt.	.05
Mill feeds....Pounds..	14.4	2.06 per cwt.	.30
Pasture			.60
Total feed and pasture			7.21
Man labor....Hours..	4.1	.28 per hr.	1.15
Horse work....Hour..	.7	.16 per hr.	.11
Veterinary			.28
Buildings			.16
Equipment			.15
Overhead			.27
Taxes and insurance			.07
Interest			.32
Total cost per 100 pounds			9.72

Oats formed a substantial part of the hog ration. Other grains were wheat, rye, and a small amount of soybeans. Tankage was the main supplementary feed used and the amount fed ranked second in value to corn. Other protein feeds consisted mainly of oil meal. Mill feeds averaged about the same composition and price as middlings.

On the average, a little more than 4 hours of man labor was required for every 100 pounds of pork produced. This was the next largest item in cost after feed. Horse work was only a minor item. Practically all hogs were immuned against cholera, which made the veterinary item comparatively large.

If one wishes to secure an estimated cost of producing pork under any given set of prices, he may use the amounts of feed and labor as given in Table 8, and apply the given set of prices. To this add the remaining miscellaneous costs, which would not vary much from year to year, and the result will be a good guide to the cost of producing pork under the given set of conditions.

Amounts and kinds of feed consumed.—Corn formed the major portion of the ration fed to hogs. The amount consumed per hundred pounds of marketable pork produced ranged from 6.48 bushels on Farm 2 to 10.68 bushels on Farm 10, or about 84 and 95 percent, by weight, of the dry feed consumed. The farms that produced their pork more efficiently or at the lower cost per hundred pounds, fed the lower amounts of corn in proportion to other feed as shown in Table 9.

Tankage was fed on all farms sometime during the period. Some farms did not make a practice of feeding tankage consistently but merely used it when their pigs seemed to be "off feed" to stimulate their appetite. On a few farms tankage was fed only to farrowing sows. The farms that fed the largest amounts gave it to growing pigs as well as pregnant sows.

Skimmilk was fed on a few farms, generally to the young pigs. Other proteins consisted mainly of oil meal. Condensed buttermilk, which is included under this heading, was fed on a few farms. Mill feeds consisted of numerous mixed hog feeds, as well as bran, middlings, hominy, and gluten feeds. Very small amounts of these feeds were fed on some farms, while on others large quantities were fed.

Harvesting costs saved by hogging corn.—Hogging corn saved harvesting costs ranging from $4.60 to $8.61 per acre according to the method of harvesting employed and cost of labor. When corn was husked off the stalk the average cost was $5.35 per acre, and by

subtracting pasture credit of 75 cents, the net cost of harvesting corn was $4.60. This was the lowest cost of any of the methods. When the corn was cut by hand and husked from the shock and the labor paid a contract price by the shock, the cost of harvesting was greatest, $8.61 per acre. The former method required 8.6 hours of man labor per acre as compared to 23.6 hours by the latter method.

TABLE 9.—Pork: Average Amount of Feed Required for Production, by Farms, 1920-1924

Farm	Efficiency of production index*	Feed per 100 pounds						
		Corn	Oats	Other grains	Tankage	Skim milk	Other proteins	Mill feeds
	No.	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*
13‡	100	7.39	0.57	1.49	1.24	0.19	.....	2.92
2	126	6.48	34.02	5.23	17.18	.....	7.64	7.87
1	128	8.37	.49	.....	2.65	22.82	.41	9.25
16	129	8.19	2.43	.....	3.21	17.32	.....	.21
9†	136	9.00	5.09	.....	4.45	36.78	.....	.23
18	138	7.37	24.79	17.09	13.34	.....	1.72	51.05
14	140	6.65	51.63	2.27	13.97	.....	4.10	44.67
12	142	8.56	4.69	13.69	20.56	.....	.47	1.43
6	142	8.12	.....	.....	9.49	88.27	.....	2.66
8	144	8.72	6.97	.83	5.26	30.12	.07	10.99
11	149	8.80	5.69	1.67	13.51	62.00	2.12	23.93
15	150	8.38	6.22	20.77	6.53	.....	.52	26.40
17	152	8.16	14.04	9.22	1.94	73.66	.....	17.10
4	153	10.28	2.39	.....	2.38	.52	.....	.10
7	155	9.06	12.44	10.66	9.16	1.83	.23	12.90
3	156	8.46	19.31	4.80	7.84	69.70	.11	7.50
10	160	10.68	16.85	1.07	6.52	40.79	.72	12.70
20	172	9.08	14.18	21.68	2.04	.....	.47	33.12
5	200	9.59	42.25	1.57	5.97	89.41	1.22	6.18
19	243	9.73	30.78	7.67	3.52	48.90	1.88	43.02
Av.§	140	8.18	15.49	5.87	9.10	20.87	1.78	14.37

*Index number secured from the total cost of production, weighted by the amount produced, and using the lowest cost as the base of 100.
†No sows were kept. Pigs were purchased and fattened.
‡Raised only a spring litter of pigs each year.
§Averages are of totals for each farm, or weighted by the amount of pork produced.
Note: Four-year records were collected on farms 12, 13, 14, 15, 16, and 17.
Three-year records were collected on farms 18 and 19.
Two-year records were collected on farm 20.

Feed cost of maintaining sows.—The annual feed cost of maintaining sows varied from $15.81 to $28.19, with an average cost of $20.76, per head on this group of farms. This includes all feed given to sows or boars thruout the year. Feed, placed in self-feeders for the pigs before they were weaned and which the sows could not reach, was not charged against the sows but directly to the pigs. The variations in the feed, care, and management of the herd are plainly shown in Table 10. Some farms fed grain sparingly, such as Farms 8, 14, and 17, with an average of a little more than three pounds per head daily. Others, such as Farms 5 and 18, fed over five pounds per day to each sow. On some farms corn was

supplemented with tankage, oil meal, and various other feeds, while on other farms very little feed other than corn was fed to hogs. Farms 2, 11, 12, 14, 18, and some others practiced feeding supplementary feeds practically all of the time, while Farms 10, 15, 16, 19, and others fed an average of about the same quantity of supplementary feeds but they were not fed regularly and with as much forethought.

Ground oats were fed on most of the farms, sometimes in the self-feeder with tankage, oil meal, and mill feeds and sometimes mixed with water to form a slop. Other grains fed were wheat, rye, and a few soybeans. Some tankage was fed on all farms. Less than a third of the farms made a practice of feeding it to any considerable extent. Skimmilk was fed to sows and litters on half of the farms, some of which fed very little tankage.

TABLE 10.—Sows: Average Annual Feed Cost and Amounts of Feeds Required, 1920-1924

Farm	Feed cost per sow*	Amount of feed per sow							Total sows
		Corn	Oats	Other grains	Tankage	Skim milk	Other protein	Mill feeds	
	Dol.	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*No.*
8	15.81	16.0	24.3	14.4	7.9	109.2	.....	37.9	83.1
12	16.27	20.3	43.1	.....	39.8	.....	0.4	3.3	89.8
19	16.36	19.6	75.3	21.2	4.1	210.2	4.7	114.5	54.0
13	17.04	21.2	.9	4.0	1.3	.....	8.1	10.9	74.3
17	17.33	16.5	54.0	31.4	8.8	131.6	.....	52.4	76.4
15	18.40	20.8	10.7	60.1	6.7	.....	1.7	64.6	59.6
1	19.19	21.5	.....	.....	5.4	140.2	.4	24.2	74.7
4	19.98	23.1	3.8	.....	6.8	4.1	.....	.....	83.5
20	20.12	19.0	44.3	28.6	2.4	.....	.....	124.3	41.9
7	20.65	22.0	36.4	17.7	9.7	10.6	1.0	53.7	101.1
14	20.67	17.2	243.3	12.1	50.1	.....	17.2	196.8	55.1
6	21.28	21.9	.....	.....	8.1	499.0	.....	4.9	40.9
3	21.67	23.0	64.7	5.6	17.2	123.5	.8	14.7	53.9
2	24.76	23.5	150.0	25.3	41.1	.....	26.9	17.1	140.0
16	25.87	29.9	16.3	.....	14.6	243.4	.....	1.9	52.9
11	25.88	21.7	21.0	5.7	48.8	472.1	11.1	148.2	62.6
18	26.00	25.9	101.4	73.4	34.0	.....	16.4	135.7	58.4
10	26.06	27.7	64.8	13.5	23.4	150.7	3.6	76.6	33.1
5	28.19	28.0	148.7	11.5	21.3	272.2	.3	2.4	34.0
Average	20.76	21.7	58.2	15.5	19.4	99.3	5.6	53.7	1269.3†

*Feed cost per sow includes a charge of $2.46 for pasture.
†Total number sows on all farms for this period.

Besides the various feeds listed, all farms provided pasture for the sows during the summer season. Their feed would be supplemented with pasture for about six months. This amounted to $2.46 annually per sow, and is included in the total feed cost given in Table 10. The sows on some farms were not fed grain when they had good pasture. This was especially true of Farm 13, which

practiced raising only a spring litter of pigs. The pasture on these farms consisted mostly of clover and timothy mixed. Bluegrass pasture was used to a certain extent in the spring and fall on some farms.

Some factors affecting efficiency.—This study presents many degrees of success among hog raisers and shows some of the possibilities for more efficient production. The breeding stock must be strong and vigorous, well nurtured and cared for in a sanitary way if the litters are to be large, strong, and healthy. This is the place to start things right for the management of efficient and successful hog production.

TABLE 11.—Pork: Variations in Some Factors Affecting the Cost of Production, by Farms, 1920-1924

Farm number	Per 100 lb. pork produced			Annual feed cost per sow	Pigs raised per litter	Feed cost of sows per pig saved	Pigs lost after 2 weeks*	Amount pork produced annually
	Total cost	Man labor	Feed cost of sows					
	Dol.	*Hr.*	*Dol.*	*Dol.*	*No.*	*Dol.*	*Pct.*	*Lb.*
13	6.60	1.21	1.14	17.04	6.3	2.70	6.3	32,154
16	8.58	4.47	1.47	25.87	4.8	2.72	2.6	23,348
2	8.77	2.78	1.22	24.76	5.5	2.25	12.1	56,641
1	8.87	3.13	1.37	19.19	3.0	3.25	25.5	20,965
14	9.28	4.95	1.21	20.67	3.8	2.76	25.5	23,476
12	9.39	3.85	1.17	16.27	4.0	2.03	19.8	31,376
9	9.42	2.83	.....	.....	.....	.....	.....	8,792
18	9.64	2.88	1.24	26.00	4.9	2.65	17.0	40,613
6	9.88	4.72	1.54	21.28	3.2	3.33	22.9	11,282
15	9.91	4.31	1.63	18.40	3.2	3.02	32.5	16,853
8	9.97	3.16	1.30	15.81	3.9	2.03	10.9	20,211
17	10.10	3.83	1.42	17.33	3.8	2.31	25.2	23,223
11	10.36	3.36	1.74	25.88	3.3	3.98	15.7	18,656
4	10.63	5.29	1.64	19.98	3.0	3.39	13.2	20,321
7	10.75	3.67	1.94	20.65	3.1	3.39	27.9	21,532
3	10.83	6.49	1.80	21.67	2.9	3.80	14.6	12,992
10	11.20	4.18	1.54	26.06	3.9	3.38	15.2	11,223
20	13.27	10.07	2.22	20.12	3.7	2.72	21.8	18,960
5	13.85	12.03	2.44	28.19	2.9	4.95	37.4	7,862
19	15.02	11.70	2.77	16.36	2.4	3.41	20.2	10,639
Av.	9.72	4.05	1.43	20.76	3.7	2.81	17.7	21,556

*This is the percentage of pigs that, having reached the age of two weeks, died before they attained marketable age. This figure does not include pigs born dead or that died before they were two weeks old.

The maintenance of the breeding herd is a large item of cost in pork production. The feed cost of sows, which is only a portion of the total cost of maintaining the breeding herd, formed on the average over 14 percent of the total cost of producing marketable pork. Table 11 shows that the feed cost of sows varied from $1.14 to $2.77 per hundred pounds of marketable pork produced, when the hogs were marketed at a weight ranging generally from 190 to 225 pounds.

Better feed and management may result in greater cost per sow, for this expenditure is a real saving if a larger number of healthier pigs are produced. There is very little relation between annual feed cost per sow and the cost of producing a hundred pounds of pork. Poor, ill-kept stock may require more feed than healthy and contented animals, and produce much less in return.

The feed cost of sows per pig saved to marketable age and per one hundred pounds of pork produced, increased as the total cost of production became greater. The range in feed cost of sows was from $2.03 to $4.95 for each pig saved. This is only the value of feed represented in the weanling pig and does not include other cost items such as labor, veterinary, use of equipment, buildings, taxes, insurance, overhead, and interest. The larger number of pigs saved per litter, the more widely the breeding herd costs were distributed.

The number of pigs saved per litter ranged from 2.4 to 6.3 as an average for the period records were collected on these farms. This seems to be an outstanding indication of the efficiency in the cost of producing pork. Table 11 plainly shows that as the number of pigs saved per litter decreased the total cost of production per unit increased. This is true for several reasons, namely: the fewer pigs saved per litter, the greater share each must bear of the breeding herd cost; the cost of producing pigs that die before they are marketable must be borne by those that live; and the fewer pigs per litter, the greater the overhead and labor cost per pig. The number of marketable pigs saved per litter may also be said to be an indication of the success of the herdsman as to the care of the breeding herd, sanitary practices, feeding methods and materials, and the general system of management.

It was not just a matter of putting in so many hours of time or attention that made the difference between the saving of two pigs as against six pigs per litter. Farms 5, 19, and 20 had a much higher labor requirement per hundred pounds of pork produced than any of the other farms and yet they saved very few pigs per litter. Their equipment was inconveniently arranged and it required much more time to feed and care for the hogs per unit than on most of the other farms. Some of the hogs became sick and unthrifty, which required extra time to get them back into feeding condition. The group of farms with the higher cost of production had a smaller annual output than the farms with the lower costs. This shows that some costs are lowered per unit of production as the volume increases. It is quite evident that the percentage of pigs lost after they were two weeks old affected the total cost of

production. The smallest loss was 2.6 percent on Farm 16 and the greatest 37.4 percent on Farm 5. The average loss on all farms of pigs after two weeks was 17.7 percent.

Table 12 shows the same factors with the farms placed in four groups according to their efficiency of production, determined by the average cost of production during the period records were collected. Farm 9 was omitted from this table as no sows were kept during the period.

TABLE 12.—Pork: Some Factors Affecting the Cost of Production, by Farm Groups,* 1920-1924

Number of farms	Per 100 pounds pork produced			Pigs raised per litter	Feed cost of sows per pig saved	Pigs lost after 2 weeks	Pork produced annually per farm
	Total cost	Man labor	Feed cost of sows				
	Dol.	*Hrs.*	*Dol.*	*No.*	*Dol.*	*Pct.*	*Lb.*
4	8.30	2.77	1.19	5.0	2.17	11.4	33,891
5	9.60	3.78	1.26	4.0	2.43	15.6	23,748
5	10.39	4.09	1.67	3.2	3.18	24.2	20,129
5	12.42	7.95	1.86	3.0	3.55	21.7	11,502

*The farms were grouped in order of the efficiency of production, as determined by the average cost of production during the period in which records were collected. Four- and five-year records were collected on 17 of the farms.

Table 13 more definitely shows the relation between the number of pigs raised per litter and the cost of producing pork. The farms were grouped according to the average number of pigs raised per litter. The size of the small litters raised was partly due to the heavy losses after the pigs were two weeks old.

TABLE 13.—Pork: Comparison of Pigs Raised per Litter and Cost of Pork Produced, by Farm Groups, 1920-1924

Number of farms	Pigs raised per litter	Per 100 pounds of pork produced			Feed cost of sows per pig saved
		Total cost	Man labor	Feed cost of sows	
	No.	*Dol.*	*Dol.*	*Dol.*	*Dol.*
4	5.4	8.47	0.79	1.21	2.52
5	3.9	9.85	1.13	1.30	2.43
5	3.2	10.62	1.24	1.80	3.40
5	2.9	10.91	1.79	1.79	3.80

The important means of lowering the cost of producing pork may be summed up by the practice of saving a large number of healthy pigs per litter and all that it implies. The cost per sow should be kept as low as is consistent with large litters and the greatest advantage to the pigs. If the sows are insufficiently nourished, especially during the gestation period, small and weak litters may be farrowed. Many of the losses said to be due to the

sow lying on the pigs, could be traced back to improper feeding during the gestation period. The pigs were weak from the start and were likely to be laid on by the sow. The reverse was true, when the sows were fed a large amount of expensive feeds the cost of which the pigs must bear.

Successful farms, in this study, followed widely different systems of management. A few things they had in common. Large litters were obtained by using good breeding animals, by feeding them properly, and by giving special attention to the sow and her litter.

CATTLE

Sales of dairy products and cattle, on the average, formed 15 percent of the total farm receipts (See Table 1). The total receipts from cattle, which ranked second in importance of all the livestock enterprises, were less than a third as large as the income from hogs.

The cattle on these farms consisted of 2 to 16 cows, or an average of 6 cows to the herd; a varying number of calves and heifers; and an average of 2 bulls for every 3 farms. Calves and heifers were raised on some farms to maintain the number of milch cows, while a few farms made a practice of selling the calves when only a few days old and purchasing cows to replenish the herd. Very few of the cattle were purebred. Most of them were grades or scrubs with varying production qualities. Dairy and beef types were represented. Cream was the chief dairy product sold; a few farms sold butter, and one farm sold milk wholesale for more than two years. All but three of the farms kept cows mainly for the production of dairy products. Three farms maintained beef herds or fed steers. Because of the small number, these beef herds are not included in this bulletin. The discussion is confined to the herds producing dairy products.

RETURNS FROM CATTLE

Farm-to-farm variations.—On all the farms the receipts from cattle were more than the cash and salable costs. Feed, taxes, insurance, and miscellaneous cash items are included in cash and salable costs. On only 4 of the 17 farms, however, were the returns above all costs as an average for the period. Returns on cattle include increase in inventory and value of products used by the household as well as sales less purchases.

The returns above cash and salable costs per animal unit varied from $71.10 on Farm 14 to $16.61 on Farm 11 as shown in Table 14.

TABLE 14.—Cattle: Variations in Herd Cost of Producing Dairy Products and Returns per Animal Unit, by Farms, 1920-1924

Farm	Return* per dollar's worth of feed	Per animal unit				
		Cost			Returns	
		Total	Nonsalable†	Cash and salable‡	Total	Above cash and salable costs
	Dol.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
14	2.32	96 58	58.47	38.11	109.21	71.10
10	2.56	87.49	60.14	27.35	98.30	70.95
15	1.95	106.81	45.98	50.87	119.61	68.74
8	2.08	106.94	70.92	36.02	98.35	62.33
20	1.61	149.23	69.41	79.81	138.42	58.61
16	2.41	95.99	72.01	23.98	82.22	58.24
6	1.96	88.87	53.03	35.84	90.53	54.69
5	1.55	171.37	110.19	61.18	115.16	53.98
17	1.67	122.49	74.31	48.18	98.31	50.13
2	1.37	144.83	68.30	76.53	114.13	48.60
19	1.70	109.38	70.74	38.64	86.19	47.55
7	1.57	136.23	76.05	50.18	92.62	42.44
9	1.34	144.83	86.32	58.51	95.85	37.34
12	1.46	118.22	83.73	34.49	64.34	29.85
3	1.25	118.60	69.09	49.51	73.81	24.31
4	1.13	83.07	51.40	31.67	50.84	19.17
11	1.17	81.33	51.46	29.87	46.48	16.61
Average	1.61	108.44	65.66	42.78	85.86	43.08

*Returns include increase in inventory, value of products used by the household, as well as sales less purchases.

†Nonsalable costs include pasture, bedding, man labor, horse work, building and equipment charge, interest, and overhead charge.

‡Salable costs include feed, taxes, insurance, and miscellaneous cash items.

Dairy versus dual purpose herds.—Farms 14, 10, 15, and 8, which received the largest returns above cash and salable costs, had cows of the dairy breed. Farms 9, 12, 3, 4, and 11 had cows mostly of the dual-purpose type, and only a few cows of a dairy breed. The farms with the dual-purpose type received the least from their cows. The returns above cash and salable costs per animal unit from the five leading dairy herds were more than 2½ times those from the dual-purpose herds. More young stock were kept in these herds and later sold for beef, than in the dairy-type herds.

Some other factors affecting the cost of production and returns will be presented in the following discussion.

HERD COST OF PRODUCING BUTTERFAT

The cost of producing butterfat was calculated on the herd basis, as the young stock were raised mainly to replace and maintain the producing herd. In calculating the herd cost of producing butterfat, the feed, pasture, labor, and other costs of all cows,

calves, heifers, and bulls were secured, from which were subtracted credits for manure, skimmilk, and net increase in herd value due to sales and growth of young cattle. Fluctuations in market value of cattle were disregarded in inventories for the purpose of calculating net herd increase. The feed cost of young stock will be presented separately.

Net cost compared with receipts.—The net herd cost of producing butterfat, as figured in Table 15, was higher than the average price received. There was a difference of 16 cents per pound. If the farmer did not value his corn stover, straw, horse labor, nor expect interest on the herd and was willing to work for 25 cents per hour, the receipts would pay all other expenses. In other words, he received market value for all home-grown grains, hay, and pasture; the purchase price for all other feeds; full charge for the use of buildings and equipment; taxes, insurance, and overhead charges; and also about 25 cents for every hour required to feed and care for the herd. Undoubtedly this enterprise furnished a means of marketing some home-grown grain, hay, and pasture which would not otherwise have been sold. Also it furnished a means of employing labor during seasons of the year when there would be little else to do.

Farm-to-farm variations.—The net herd cost of producing butterfat on these 17 farms varied from 34 cents to $1.07 per pound, as shown in Table 15. These are averages of records secured for four or five years on all the farms with the exception of two. Records were secured for three years on Farm 19 and for two years on Farm 20.

Feed and pasture constituted half of the total cost and will be further analyzed in a later table. Man labor formed about a third of the total cost and was the largest single item. The remaining cost was made up of bedding, horse work, use of buildings and equipment, interest on herd, taxes, insurance, and other overhead charges. These items were of minor importance, but collectively have influenced the total costs on some farms to quite an extent, as on Farms 7, 12, 16, 19.

Credits to gross herd-cost of producing butterfat averaged $27.31 on all farms. Skimmilk, as a credit, was valued at 35 cents per hundred pounds, and manure at $1.00 per ton. Other credits were for net herd increase due to sales and growth of young stock recorded at local market values.

TABLE 15.—Cattle: Variations in Herd Cost of Producing Butterfat, by Farms, 1920-1924

Farm	Cows in herd	Ratio of young stock in herd	Annual cost per cow or her equivalent in young cattle											Butterfat	
			Feed and pasture	Bedding	Man labor	Horse work	Buildings	Equipment	Interest on herd	Taxes, insurance	Overhead	Gross cost	Credits*	Net cost	Per animal unit	Cost per pound
	No.	*Pct.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Lb.*	*Dol.*
14	3.7	14.3	47.06	2.34	31.35	1.90	2.74	2.23	3.97	0.92	4.07	96.58	27.74	68.84	202	0.34
10	3.8	9.1	38.47	1.51	25.96	1.85	3.92	5.41	2.49	.44	7.44	87.49	29.14	58.35	151	.39
6	4.8	18.7	46.20	1.53	30.52	1.28	.93	1.50	3.39	1.36	2.16	88.87	18.67	70.21	169	.42
15	10.1	10.7	61.27	1.54	26.86	.80	3.10	2.24	3.32	.57	7.11	106.81	27.71	79.08	190	.42
20	9.4	38.0	85.80	1.29	30.28	1.32	8.78	3.52	6.78	1.72	9.76	149.23	49.17	100.82	206	.49
8	7.1	20.3	47.27	1.82	33.80	2.10	5.85	2.30	2.70	.72	10.38	106.94	24.72	82.22	165	.50
16	5.0	35.4	34.16	2.19	33.92	5.26	3.70	4.51	4.06	.78	7.41	95.99	34.39	61.62	121	.51
19	3.3	29.5	50.77	1.42	30.39	.74	6.03	.90	4.81	1.31	13.01	109.38	34.17	75.19	134	.56
2	4.1	24.3	83.29	2.71	37.78	3.46	3.55	1.44	3.94	.86	7.80	144.83	36.61	108.22	185	.58
17	5.8	32.5	58.73	1.30	34.80	.90	4.55	8.86	3.77	.81	8.77	122.49	33.80	91.28	147	.61
7	3.8	6.0	59.17	2.60	43.36	9.05	4.88	3.87	3.99	1.51	7.80	136.23	21.06	118.72	171	.70
5	3.1	13.2	74.41	2.83	67.74	.88	3.59	3.81	3.83	.51	13.77	171.37	30.48	140.85	191	.74
9	3.7	15.4	71.28	2.52	45.56	4.81	4.65	3.74	3.31	.95	8.01	144.83	29.26	115.57	150	.77
3	5.3	27.2	59.13	2.01	36.27	1.83	2.14	4.44	3.16	.61	8.01	118.60	20.36	98.24	127	.78
4	5.9	67.4	44.92	1.18	23.20	1.47	1.33	.53	3.39	.81	6.24	83.07	22.19	60.88	67	.90
11	7.8	35.7	39.62	1.79	20.20	1.80	7.92	2.20	3.92	.86	3.02	81.33	20.91	59.42	57	1.06
12	4.0	39.1	44.04	2.46	33.95	7.17	6.41	6.74	3.77	1.31	11.94	118.22	28.25	89.52	83	1.07
Av.	5.2	31.6	53.29	1.80	31.50	2.40	4.20	3.10	3.71	.90	7.52	108.44	27.31	81.13	136	.60

*Credits to the herd cost of producing butterfat, on the average, consisted of $12.26 net herd increase, $10.41 for skimmilk, and $4.64 for manure.

In comparing the three farms which had the lowest costs, Farms 14, 10, and 6, with the three farms which had the highest costs per pound of butterfat, Farms 4, 11, and 12, there was little difference in the various yearly costs per animal unit. The main difference was in the production of butterfat. In one group the production was more than 150 pounds per animal unit, while in the other group the production was less than 90 pounds. The herds with the lowest cost per pound of butterfat contained 18 percent of young stock in terms of animal units, while those with the highest cost contained 53 percent (Table 16).

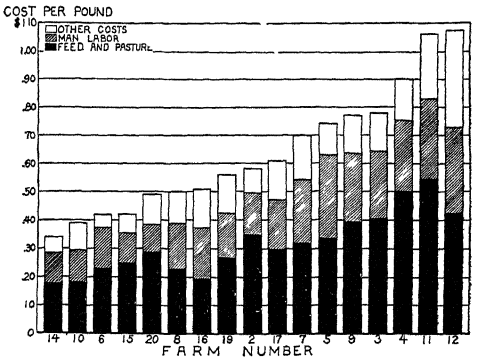

Fig. 4.—Comparison of feed, labor, and other costs of producing butterfat, figured on the herd basis, on 17 farms in Greene County, 1920-1924

Effect of young cattle on herd butterfat costs.—Herd cost of butterfat production was greatly affected by the amount of young stock raised. The 75 herd-year records were placed into two classes according to the butterfat production per cow, as shown in Table 16. Then each of these classes was divided into two groups according to the percentage of young stock

TABLE 16.—Effect of Production per Cow and Ratio of Cows to Total Herd on the Herd Cost of Producing Butterfat, 1920-1924

Item	Herd cost with annual butterfat production per cow of:			
	Less than 200 pounds		200 pounds or more	
	Group 1 low ratio of cows	Group 2 high ratio of cows	Group 3 low ratio of cows	Group 4 high ratio of cows
Number of:				
Herd records	22	19	16	18
Cows per herd	6.1	3.7	5.5	5.4
Animal units per herd	10.3	4.2	9.6	6.1
Ratio of cows to total herd..Percent..	59	88	57	88
Average butterfat production:				
Per animal unit.....Pounds..	83	155	149	201
Per cow.....Pounds..	141	176	260	229
Cost per animal unit:				
Feed and pasture.....Dollars..	45.29	56.30	60.62	56.39
Man labor.....Dollars..	27.01	41.77	30.38	33.94
Other costs.....Dollars..	22.20	27.29	25.21	21.66
Total gross cost.....Dollars..	94.50	125.36	116.21	111.99
Credits.....Dollars.	23.65	21.85	34.96	27.00
Net costs.....Dollars..	70.85	103.51	81.25	84.99
Cost per pound of butterfat..Dollars..	.85	.67	.55	.42

in the herd, or low and high ratio of cows to the total number of animal units in the herd. Each of the four groups had nearly the same number of herds.

Group 1, with the lower producing cows and low ratio of cows to the total herd, or having the larger proportion of young stock, had the highest cost per pound of butterfat. Comparing this with Group 3, which had practically the same percentage of cows in the herd but had cows that produced more butterfat, the cost was lowered 30 cents per pound.

Group 3, which contained herds with low ratio of cows to total animal units, had 13 cents higher costs per pound of butterfat than Group 4, which contained fewer young stock. The average butterfat production per cow in Group 3 was higher than in Group 4; but, because more young stock was kept, the herd cost of butterfat was greater.

Any cost of butterfat production is affected by the amount produced per cow. Herd cost was further affected by the amount of young stock kept in proportion to the number of cows. These 75 herd-year records collected from 1920 to 1924, inclusive, showed that herds with few young stock in proportion to the cows produced butterfat the cheapest. The increase in value of young stock did not pay for all costs connected with their production.

Effect of production per cow on costs.—The 75 herd-year records were classed into three groups according to the butterfat production per cow. The classification of production was made so that about an equal number of records would fall in each group. With practically the same amount of young stock in each group, the herd cost of producing butterfat decreased as the amount of butterfat per cow increased (Table 17). The average butterfat production per cow in the high producing group was 116 pounds more and cost 34 cents per pound less than that of the low group.

Relation of feed cost to butterfat production.—The cows of the high-producing herds gave 86 percent more butterfat with only 28 percent higher feed cost than the cows of the low-producing herds (Table 17). Group 2, Table 17, also gave an increased amount of butterfat with only slightly higher feed costs. Cows respond generously to being well fed.

The amount of butterfat produced as well as the cost of production was affected by the type of cows and the way they were fed. The dual purpose herds generally produced less butterfat per cow than those of the dairy type. Increase in value of young stock did not pay for their keep. The various combinations of the above

factors, with other minor factors, were the causes for variations in herd costs of producing butterfat from farm to farm as displayed in Table 15.

TABLE 17.—Effect of Production per Cow on the Herd Cost of Producing Butterfat, 1920-1924

Cost item	Herd cost with annual butterfat production per cow of:		
	Less than 185 pounds	From 185 to 215 pounds	215 pounds or more
Number of herd records	26	22	27
Ratio of cows to total herd....Percent..	68	69	68
Average butterfat production:			
Per animal unit ....Pounds..	92	135	170
Per cow ....Pounds..	135	197	251
Cost per animal unit:			
Feed and pasture....Dollars..	47.29	49.51	60.54
Man labor....Dollars..	28.78	34.57	31.99
Other costs....Dollars..	23.60	23.62	23.87
Total gross cost ....Dollars .	99.67	107.70	116.40
Credits ....Dollars.	23.33	23.98	32.15
Net cost....Dollars..	76.34	83.72	84.25
Cost per pound of butterfat....Dollars..	.83	.64	.49

Feed consumed by cows.—Corn formed the major portion of the concentrates used in feeding cows on these farms, as shown in Table 18. More than 55 percent of the corn was cut, most of which was husked from the shock and the stover fed to livestock. About 15 percent of the corn cut was shredded and the remaining portion was husked and fed as long stover. Cattle received about 60 percent of the total stover fed to livestock. The amount of stover fed to cattle was four times the weight of hay. Farms 15 and 20 fed silage in addition to hay and stover.

The cattle had access to pasture for at least six months of the year and a charge, which averaged $2.10 per animal-unit-month was included in the total feed cost. The pasture was mainly clover and timothy mixed and was rotated with the cropping system. As an average on all farms, 24 acres was devoted to rotated pasture and 10 acres to permanent pasture.

The annual feed cost per cow ranged from $31.73 to $101.74, with an average of $55.58 (Table 18). The feed cost was greater for the high producing cows than for the low producing cows. The average annual butterfat production on the different farms ranged from 88 to 333 pounds per cow, with an average of 199 pounds.

The four herds which had the lowest production per cow were chiefly made up of dual-purpose cattle, while the herds with the highest production per cow were of the dairy type. The cows in the former group received less grain and concentrates but more cheap roughage, such as corn stover, than the latter group.

TABLE 18.—Cows: Annual Feed Consumption, Total Feed Cost and Amount of Butterfat Produced per Cow, by Farms, 1920-1924

Farm	Amount of butterfat per cow	Concentrates						Roughage			Total feed cost		
		Corn	Oats	Cottonseed meal	Bran	Other	Total	Hay	Stover	Total	Per cow	Per lb. of butterfat	Portion of total herd cost
	Lb.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Dol.*	*Dol.*	*Pct.*
11	88	1,028	165	77	89	58	1,417	937	4,125	5,064	47.36	0.54	51
12	137	1,956	96	8	6	100	2,166	81	5,374	5,455	42.47	.31	29
3	174	1,787	800	.....	195	129	2,911	928	2,333	3,261	59.06	.34	44
9	177	2,782	286	7	.....	.....	3,075	682	4,320	5,002	63.24	.36	47
7	182	2,211	1,792	.....	.....	24	4,027	1,814	4,995	6,809	57.99	.32	46
10	187	1,194	.....	.....	.....	.....	1,194	287	6,149	6,436	38.06	.20	51
16	187	225	.....	.....	.....	.....	225	593	5,733	6,326	34.93	.19	37
19	190	1,478	.....	.....	182	28	1,688	498	2,624	3,122	31.73	.17	30
4	207	1,986	721	.....	.....	.....	2,707	460	470	930	47.00	.23	26
8	207	1,097	1,312	7	6	31	2,453	1,593	4,716	6,309	46.44	.22	44
6	208	1,234	.....	44	363	17	1,658	568	3,827	4,395	47.64	.23	55
15	213	1,397	106	27	20	395	1,945	802	2,920	9,308*	62.08	.29	52
17	218	1,462	448	155	40	245	2,350	399	3,476	3,875	60.42	.28	46
5	220	1,541	1,320	.....	.....	.....	2,861	2,201	586	2,787	67.77	.31	42
14	235	1,496	137	3	40	27	1,703	1,241	6,573	7,814	48.60	.21	62
2	244	2,274	1,230	304	65	276	4,122	2,237	4,876	7,113	92.13	.38	66
20	333	1,705	1,913	80	27	771	4,496	2,321	1,144	9,975*	101.45	.30	59
Av.	199	1,537	400	42	57	134	2,170	1,025	3,680	5,605	55.58	.28	47

*Farm 15 fed 5,586 pounds of silage and Farm 20 fed 6,510 pounds; the average of all the farms was 900 pounds of silage per cow, which is included in the total amount of roughage.

The total feed cost per pound of butterfat produced was greatest among the group of dual-purpose herds. The group of dairy herds with the highest production of butterfat per cow, also with the highest annual feed cost per cow, had a lower feed cost per pound of butterfat than the group of dual-purpose herds.

Feed was 68 percent of the net butterfat cost when figured on the herd basis. The cow cost of producing butterfat may be calculated by assuming that the same ratio exists between the feed cost of cows and net butterfat cost when figured on the cow basis. The average annual feed cost per cow was $55.58, which, with the above assumption, would make the total net cost per cow $81.74, or 41 cents per pound of butterfat produced. The average selling price was 44 cents, which left a three-cent margin. The production of the cows paid all of their expenses and a little more but the increase in young stock did not pay their whole cost.

Feed maintenance of bulls.—There was a wide variation in the amount of concentrates required for the maintenance of the bulls on these farms, as shown in Table 19. Some farmers gave the bulls no grain, while others fed more than a thousand pounds of grain annually. More than 90 percent of the concentrates consisted of corn. Oats came second, in the proportion of about 1 bushel of oats to 10 of corn.

Corn stover was used as the main roughage, with an average of 3040 pounds of stover and 923 pounds of hay per bull. Farms 16, 12, 11, and 2, with the low feed cost per bull, fed very little or no

TABLE 19.—Bulls: Annual Feed Requirement and Total Feed Cost per Bull, by Farms. 1920-1924

Farm	Total feed cost	Concentrates				Roughage			Pasture cost
		Corn	Oats	Other	Total	Hay	Stover	Total	
	Dol.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Dol.*
16	21.05	.....	.....	.....	.....	366	5,234	5,600	9.03
12	23.58	.....	.....	.....	.....	.....	6,684	6,684	10.07
11	24.49	188	14	.....	202	373	4,373	4,747	10.17
2	24.76	.....	.....	.....	.....	.....	4,200	4,200	7.36
15	29.38	77	.....	.....	77	470	2,162	6,579*	11.64
8	30.08	102	.....	.....	102	.....	4,737	4,737	16.44
1	30.78	147	35	.....	182	576	1,152	4,088*	13.54
4	39.28	1,024	58	.....	1,082	551	1,501	2,052	15.89
17	40.38	1,073	246	51	1,370	921	3,529	4,450	10.40
18	45.36	997	.....	.....	997	1,419	3,328	7,734*	11.45
20	53.45	607	.....	125	732	1,935	1,263	10,638*	5.44
13	57.87	1,690	.....	.....	1,690	3,316	1,314	4,630	10.56
Av.	36.33	571	35	14	620	923	3,940	5,320	11.50

*These farms fed the following amounts of silage: Farm 15, 3,947 pounds; Farm 1, 2,360 pounds; Farm 18, 2,987 pounds; Farm 20, 7,540 pounds; and 1,257 pounds on the average on all farms, which amounts are included in the total amount of roughage.

concentrates, and large quantities of stover. Farms 17, 18, 20, and 13, with higher costs, fed more concentrates and considerably more hay in comparison to corn stover. Pasture formed a substantial portion of the feed cost of bulls. On Farm 8 this charge was 54 percent of the total feed cost. On Farms 16, 12, 11, 15, 1, and 4 pasture formed more than 40 percent of the total feed cost of bulls.

Feed consumed by heifers.—This classification includes heifers between one year old and the time of freshening. Most of these heifers were carried as cheaply as possible. They were fed largely on roughage during the winter season and had access to pasture in the summer. Very little grain was fed in most cases, the amount averaging a little more than a pound per day. Some were fed as much as four pounds and others less than one-tenth of a pound per day.

Farms 5, 17, and 20, three of five farms with the highest feed cost per heifer, had cows that produced more than 200 pounds of butterfat per cow. The development of the heifer materially aids the size, constitution, and capacity of the cow.

The duration of pasture varied from about 2 to 11 months. Farms 12, 9, and 5 had the highest pasture cost per heifer, because of the added charge for pasturing corn stalks during most of the winter months. The pasture cost averaged $5.60 per heifer, or about 30 percent of the total feed cost. The range in annual feed cost was $11.90 to $40.97 per heifer, with an average of $19.77, as shown in Table 20.

TABLE 20.—Heifers: Annual Feed Requirements and Total Feed Cost per Heifer, by Farms, 1920-1924

Farm	Total feed cost	Concentrates				Roughage			Pasture cost
		Corn	Oats	Other	Total	Hay	Stover	Total	
	Dol.	*Lb.*	*Lb*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Dol.*
14	11.90	95	.....	.....	95	.....	1,355	1,355	5.26
19	12.04	359	.....	9	368	76	981	1,057	6.03
8	13.24	34	.....	.....	34	399	2,170	2,569	4.75
10	13.28	115	.....	.....	115	17	2,564	2,581	6.47
3	14.42	584	90	18	632	428	1,784	2,212	1.79
11	15.23	257	.....	.....	257	156	3,426	3,582	5.20
6	15.90	262	.....	.....	262	102	2,122	2,224	5.97
16	16.01	34	.....	.....	34	190	3,238	3,428	7.53
2	18.18	154	78	25	257	429	1,142	1,571	5.72
7	20.98	1,554	.....	.....	1,554	7	1,857	1,864	6.37
17	23.00	544	88	19	651	125	2,744	2,869	3.73
12	26.77	267	.....	.....	267	.....	6,598	6,598	10.33
20	27.75	57	.....	50	107	461	893	5,520*	4.70
9	39.71	1,360	.....	.....	1,360	.....	4,500	4,500	11.69
5	40.97	586	37	.....	623	919	690	1,609	12.51
Av,	18.88	281	22	11	314	280	2,318	3,041*	5.60

*Farm 20 fed 4,166 pounds of silage, which is included in the total amount of roughage. The average amount of total roughage includes 411 pounds of silage.

Monthly feed consumption of calves.—For the purpose of this study, cattle, from the time they were born until one year of age, were considered as calves. Many of the calves were not kept a full year. They were sold either when a few days old or for veals when one or two months of age, or they were kept for feeding and breeding purposes. Table 21 shows the average length of time, in months, that the calves were kept on the respective farms. The feed cost per month varied considerably with the age of the calf or, in other words, with the length of time the calf was kept.

TABLE 21.—Calves: Monthly Feed Requirements, and Feed Cost per Calf, and Average Length of Time Calves Were Kept, by Farms, 1920-1924

Farm	Monthly feed cost	Concentrates				Milk		Roughage			Time calves were kept*
		Corn	Oats	Other	Total	Whole	Skim	Hay	Stover	Total	
	Dol.	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Lb.*	*Mo.*
11	1.08	3.2	.....	0.4	3.6	26	144	8	47	55	8.5
4	1.48	10.2	11.9	.....	22.1	27	118	12	32	44	9.0
16	1.75	1.1	1.0	.....	2.1	1	401	.....	71	71	6.1
10	1.83	6.3	.7	.3	7.0	50	152	.....	33	33	4.6
6	1.90	2.4	.....	5.9	8.3	46	174	.....	41	41	5.6
3	1.93	20.6	13.3	3.1	37.0	4	15	12	56	68	7.4
12	2.10	19.6	.....	.5	20.1	83	.....	.....	117	117	4.4
20	2.15	14.8	9.1	1.3	25.2	13	9	34	25	180†	5.3
14	2.21	6.9	.....	.8	7.7	92	.....	.....	159	159	4.5
2	2.43	13.9	15.6	.. ..	29.5	45	218	21	79	100	5.3
8	2.52	.5	.4	.....	.9	80	214	6	42	48	4.2
17	2.55	9.2	.7	.5	10.4	87	162	6	69	75	6.0
5	2.85	2.9	5.4	.....	8.3	120	431	4	2	6	6.8
19	2.99	1.9	.....	.....	1.9	144	82	... ..	14	14	4.6
7	4.49	10.4	.....	.....	10.4	236	19	4	61	65	2.4
15	4.62	.....	.....	.....	.....	259	.....	.... ..	6	6	1.6
9	6.95	33.2	9.2	.....	42.4	339	.....	.....	93	93	3.8
Av.	2.03	8.8	5.2	.6	14.6	56	130	9	54	71	5.8

*The average length of time calves, under one year of age, were kept on the farm.
†Farm 20 fed 121 pounds of silage, which is included in the total roughage.

Farms 4 and 11, with the lowest monthly feed cost, kept their calves 8.5 and 9 months, respectively, or longer on the average than any other farms. This does not mean that all calves were disposed of at this age. The practice of raising the calves for heifers or steers was generally followed on these farms. The average number of months which they were classed as calves was lowered by the sale of veals or by deaths.

The range in monthly feed cost was $1.08 to $6.95 per calf, with an average of $2.03. This includes charge for pasture, if any were secured by the calves. The average length of time the calves of all the farms were kept was 5.8 months.

The monthly feed cost of calves decreased as the length of time they were kept increased. The feed requirement for calves during the first and second months had a much higher valuation than for any other month. When the farms were grouped according to the average length of time calves were kept, the feed cost averaged 99 cents less per month when the calves were kept more than five months than when they were kept for a shorter time.

TABLE 22.—Calves: The Effect of Length of Time Calves Were Kept Had on Feed Cost, by Groups, 1920-1924

Farm group with	Number of farms	Average time kept	Feed cost per calf	
			Per month	For average time kept
Calves kept, on the average:		*Mo.*	*Dol.*	*Dol.*
Less than 5 months.....	8	3.66	2.74	10.03
More than 5 months.....	9	7.20	1.75	12.60

SHEEP

The keeping of sheep was a minor enterprise on these farms, as shown by Table 1. The sale of lambs and wool contributed 5.9 percent of the total farm receipts. During the five years 20 of the 25 farms kept sheep all or a portion of the time, which is quite typical of the surrounding area. Records from six of these farms were not included in this analysis because their flock data covered only one year or less.

The flocks ranged in average size from 13 to 106 sheep, with an average of 46 sheep per flock on the 14 farms. The flocks were composed mainly of ewes; about 30 percent were lambs and yearlings. No wether flocks were kept. The average size of a flock was secured by calculating a "sheep" equivalent to 1 ewe, 1 ram, 1 yearling, 1 lamb over six months, or 6 lambs under six months of age.

Sheep of the fine-wool type were kept on 10 of the 14 farms considered in this part of the study. Farms 3, 4, 9, and 13 raised sheep of the mutton type. The practice of breeding the ewes was followed on all farms except No. 9, where they were not bred two out of the five years.

RETURNS FROM SHEEP

Farm-to-farm variations.—The receipts on 3 out of 14 farms keeping sheep did not cover all costs. The annual return above cost per sheep ranged from $4.30 on Farm 20 to minus 35 cents on Farm 9, with an average of $2.42 on all farms, as shown in Table 23.

TABLE 23.—Sheep: Variations in Cost of Production and Returns, by Farms, 1920-1924

Farm	Returns* per dollar's worth of feed	Returns* per hour of labor	Annually per sheep		
			Total cost	Total returns*	Returns* above cost
	Dol.	*Dol.*	*Dol.*	*Dol.*	*Dol.*
20	2.84	1.25	5.93	10.23	4.30
18	2.38	2.27	6.58	10.76	4.18
12	2.83	1.20	6.14	9.38	3.24
11	2.18	1.87	5.47	8.45	2.98
15	1.88	1.68	5.40	7.67	2.27
8	1.86	1.03	6.32	8.11	1.79
4	1.75	.83	5.95	7.28	1.33
13	1.64	1.00	8.69	9.94	1.25
17	2.02	.77	4.24	5.15	.91
6	1.49	.46	7.11	7.56	.45
7	1.54	.46	6.93	7.34	.41
3	1.76	.29	6.42	6.36	—.06
1	1.37	.15	5.93	5.63	—.30
9	1.40	.22	9.72	9.37	—.35
Average	1.89	1.22	6.35	8.77	2.42

*Returns include increase in inventory, as well as sales of wool and mutton, less purchases.

The returns for each dollar's worth of feed consumed ranged from $2.84 on Farm 20 to $1.37 on Farm 1. The farms with a good return above cost also had a good return for each dollar's worth of feed fed.

Farms 3, 1, and 9, whose receipts did not cover all assignable costs, merely received less than 30 cents an hour for their labor.

When all costs except labor are subtracted from total returns, and divided by the hours of labor, the result is the amount received per hour of labor. This amount varied from $2.27 on Farm 18 to 15 cents on Farm 1, with an average of $1.22 on all farms.

COST OF PRODUCING WOOL AND MUTTON

Annual feed requirement per sheep and net cost of wool and mutton were calculated for the various flocks. Feed, labor, and other costs cannot definitely be distributed between wool and mutton. However, an attempt was made to allocate these joint expenses to the two products on the basis of the receipts from wool and from mutton, as a means of further studying some of the factors related to the efficiency of production.

Variations in cost of keeping a sheep.—The annual cost of keeping a sheep on these farms ranged from $4.24 to $9.72, with an average of $6.35. The chief reason for this variation was the difference in feed requirement. Feed constituted about 64 percent

of the total cost, and its value ranged from $2.41 to $6.26 per sheep (Fig. 5). This variation in feed cost was almost in direct proportion to the net cost per sheep. The kinds and amounts of feed consumed will be considered later.

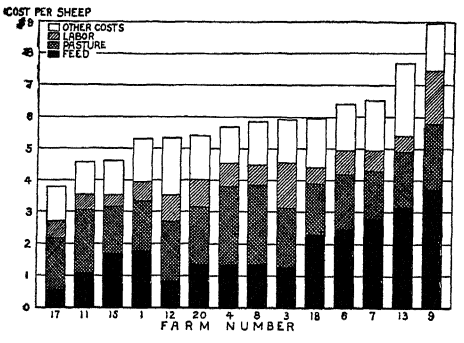

Fig. 5.—Comparison of annual feed, pasture, labor, and other costs of keeping per sheep on 14 farms in Greene County, 1920-1924

Man labor was the next largest item and formed about 12 percent of the total cost. Farms 3, 6, 9, 12, and 20 had the highest labor cost per sheep and they also had small flocks.

The remaining 24 percent of the total cost was made up of numerous small items, such as horse work, buildings, equipment, interest, taxes, insurance, overhead, and miscellaneous items which included shearing, wool twine, salt, and veterinary service.

From the total cost, a manure credit which averaged 60 cents per sheep was subtracted, leaving an annual net cost of $5.75 per sheep, this being the joint cost chargeable to wool and mutton.

Annual feed consumption and labor per sheep.—The amount of grain consumed annually averaged a little over 1 bushel of corn and ½ bushel of oats per sheep, as shown in Table 24. This grain was fed during the winter months, to lambs that were being fattened for market and to the ewes up to lambing time.

Farm 7 always kept the lambs, feeding them grain during the winter and selling them in late spring or early summer, which caused the amount of corn required per sheep to be high.

Farms 3, 4, 8, 11, 17, and 18 usually sold their lambs in the fall when taken from pasture with little or no corn being fed to them, which resulted in a low corn requirement per sheep.

Dry forage consisted of mixed clover and timothy hay, and corn stover on most of the farms. Farms 1, 13, and 20 fed some alfalfa hay in addition to corn stover, while Farm 15 fed some silage one year. A sheep, on the average, required 100 pounds of hay and 165 pounds of stover per year.

The length of pasture season varied on the different farms from about seven to ten months. With a long pasture season generally less grain was fed.

TABLE 24.—Sheep: Variations in Annual Feed and Labor Requirement per Sheep, by Farms, 1920-1924

Farm	Efficiency of production index*	Amount required per sheep							Average size of flock
		Corn	Oats	Dry forage	Pasture	Bedding	Man labor	Horse work	
	No.	*Lb.*	*Lb.*	*Lb.*	*Dol.*	*Lb.*	*Hr.*	*Hr.*	*No*
17	100	26.8	1.8	121	1.83	54	2.0	0.2	46
11	111	36.3	2.7	189	2.37	53	1.9	.3	38
8	115	26.9	19.3	373	2.69	56	2.4	.9	66
20	117	47.1	.....	210	1.97	35	4.2	.6	40
15	117	96.2	.....	321†	1.73	44	1.6	.5	67
4	121	37.6	34.3	88	2.61	47	2.5	.5	47
3	130	36.2	17.6	214	2.04	42	5.2	.6	31
12	133	46.7	.....	249	2.15	45	3.5	.7	39
1	135	78.6	26.9	166	1.75	68	2.7	.3	37
18	137	11.1	20.6	373	1.75	69	2.1	1.5	106
7	141	116.6	25.9	310	1.59	52	2.5	.7	74
6	145	85.0	.....	320	1.93	59	2.8	.6	27
13	188	28.9	1.4	344	1.97	73	1.8	.3	33
9	198	85.1	136.1	261	2.23	62	6.7	.8	13
Av.	117	68.4	16.8	267	2.02	48	2.6	.7	46

*Index number secured from the total cost of keeping a sheep, weighted by the size of the flock and using the lowest cost as the base of 100.
†This includes 43 pounds of silage.

The man labor requirement was less per sheep with the large flock than with the small flocks. The range was from 1.6 to 6.7 hours, with an average of 2.6 hours per sheep.

Average annual cost of keeping a sheep.—The average annual amounts of feed and labor consumed in keeping a sheep per year, with rates of value per unit, are given in Table 25. As prices change other rates may be substituted with these quantities. The pasture charge was calculated on the basis of 7 to 10 sheep equal to an animal unit. With an average rate, during the five years, of $2.10 per animal-unit-month of pasture the average monthly charge would be from 21 to 30 cents per sheep. Other items of cost, such as use of buildings and equipment, overhead, taxes, insurance, miscellaneous, and interest on flock made up 24 percent of the total cost. These do not materially change in amount from year to year and could be used along with the given quantities of feed and labor at current rates in calculating the average cost of keeping a sheep.

Variations in cost of wool and mutton.—The annual net cost of mutton and wool per sheep has been divided into an assumed cost of producing wool and mutton on the basis of the percent that the receipts of wool and mutton were of the total flock income other than manure. Wool receipts were from the sales of wool, while mutton receipts represent the net increase or decrease in inventory value of the flock plus sales of lambs and sheep. Fluctuations in market values were disregarded in taking inventories.

TABLE 25.—Average Annual Cost of Keeping a Sheep, 14 Farms, 1920-1924

Item of cost	Amount	Value	
		Per unit	Total
Feed:		*Dol.*	*Dol.*
Corn.....Pounds..	68.4	0.74 per bu.	0.74
Oats.....Pounds..	16.8	.43 per bu.	.23
Hay.....Pounds..	100	12.60 per T.	.63
Corn stover.....Pounds..	165	4.40 per T.	.37
Pasture			2.02
Total feed and pasture			3.99
Bedding, straw.....Pounds..	48	3.00 per T.	.07
Man labor.....Hours..	2.6	.29 per hr.	.75
Horse work.....Hours..	.7	.17 per hr.	.13
Buildings and equipment			.36
Overhead			.17
Taxes and insurance			.15
Miscellaneous			.24
Interest on flock			.50
Total cost of keeping a sheep			6.35
Manure credit			.60
Net cost of wool or mutton			5.75

The flock income obtained from wool varied on these farms from 24 to 74 percent, with an average slightly under 50 percent, as shown by Table 26. Farms 3, 4, 9, and 13, which kept mutton type sheep, received the lowest percent of the flock income from wool. Farms 1, 6, and 17 received the highest percent of the flock income from wool. This was not alone caused by keeping fine-wool sheep, which they did, but because very few lambs were raised, as will be seen in Table 27. Only 33 to 46 lambs were raised per 100 ewes on this last group of farms.

The cost per dollar of receipts, in a measure, shows the cost of a dollar's worth of mutton, as well as of wool, when considered on a joint-cost basis. A dollar's worth of mutton cost 72 cents, as an average on all farms. This cannot be taken as the exact cost of producing mutton, but it seems fair to allocate that portion of the joint-costs to mutton. The range in cost of production was from 56 cents on Farm 20 to $1.06 on Farm 1. Farms 11, 15, 18, and 20, with low cost of production per dollar of receipts, kept fine-wool sheep and raised, as an average, 84 lambs per hundred ewes. Farms 1 and 6 had high cost of production per dollar of receipts because of the small number of lambs raised and high annual cost per sheep. Farm 9, with a very small flock of mutton-type sheep had a high annual cost, and raised lambs three years out of five which caused a high cost of mutton and wool per dollar of receipts.

The cost per pound of wool, on this basis of calculation, ranged from 22 cents on Farm 20 to 49 cents on Farm 6, with an average of 33 cents on all farms. As there is no such thing as a separate cost for wool, these figures are not exact but are the portion of the total cost of the two products that it seems fair to allocate to wool. The pounds of wool given in Table 26 are on the sheep basis, the same as other costs have been calculated, and do not represent the weight per fleece. The flocks that produced the larger amounts of wool per sheep had the lower cost per pound of wool. The production cost per pound of wool was not entirely dependent upon the amount of wool produced per sheep, as practically would be the case if no lambs were raised. With total production costs divided, as in this study between mutton and wool, the cost of producing a pound of wool, as well as of mutton, is influenced by the number of lambs raised.

TABLE 26.—Wool and Mutton: Variations in Cost of Production by Farms, 1920-1924

Farm	Annual cost wool and mutton per sheep	Division of receipts		Net cost per sheep		Cost per dollars receipts*	Wool per sheep	Cost per pound of wool
		Mutton	Wool	Mutton	Wool			
	Dol.	*Pct.*	*Pct.*	*Dol.*	*Dol.*	*Dol.*	*Lb.*	*Dol.*
20	5.41	50.3	49.7	2.72	2.69	0.56	12.0	0.22
15	4.59	51.2	48.8	2.35	2.24	.67	9.1	.25
11	4.58	34.9	65.1	1.60	2.98	.60	10.9	.27
18	5.97	51.9	48.1	3.10	2.87	.58	10.4	.28
17	3.80	34.2	65.8	1.30	2.50	.81	8.9	.28
12	5.35	40.9	59.1	2.19	3.16	.63	10.9	.29
4	5.69	65.6	34.4	3.73	1.96	.81	6.1	.32
13	7.70	75.3	24.7	5.80	1.90	.86	5.6	.34
7	6.51	46.9	53.1	3.05	3.46	.94	9.6	.36
3	5.93	56.2	43.8	3.34	2.60	1.01	6.9	.38
9	8.98	61.6	38.4	5.53	3.45	1.04	7.4	.46
8	5.85	52.7	47.3	3.08	2.77	.77	5.9	.47
1	5.28	25.6	74.4	1.35	3.93	1.06	8.3	.47
6	6.38	26.7	73.3	1.70	4.68	.93	9.6	.49
Av.	5.75	50.2	49.8	2.89	2.86	.72	8.8	.33

*Receipts include net increase in inventory as well as cash sales.

Note: On Farms 3, 4, 6, 7, 9, and 11 five-year records were collected; on Farms 12, 13, and 15 four-year records were collected from 1921-1924, inclusive; on Farm 8, records for 1920, 1923, and 1924; on Farm 17, for 1921-1923, inclusive; on Farm 18, for 1922-1924, inclusive; on Farm 1, for 1922 and 1923; and on Farm 20 for 1923 and 1924.

Yearly variations in cost of wool.—The cost of producing wool was highest in 1920, 75 cents per pound. In 1921 and 1922 the cost was the lowest, averaging 25 cents per pound each year. The difference in cost was partly due to the higher price of feed in 1920, which made the feed cost over twice as much as that of 1921. Man labor and other costs were also greater in 1920 than in 1921. In

1920 the receipts from wool constituted more than 66 percent of the total receipts from sheep, while in 1921 they constituted 47 percent. This difference was due to a more rapid decline in price of wool than of mutton. With the method of dividing costs in the ratio of the receipts received from wool and mutton, the wool in 1920 must bear a much larger portion of the total cost than in 1921 because of this change in market prices.

From 1921 to 1924, inclusive, there was a gradual increase from 25 to 31 cents per pound in the cost of production, with the greatest increase in 1924. Feed prices continued to rise thru 1923 and 1924.

TABLE 27.—Sheep: Some Factors Related to the Cost of Mutton and Wool Production, by Farms, 1921-1924

Farm	Receipts above net cost per sheep	Lambs raised per 100 ewes	Amount of wool per fleece	Cost of wool per pound	Per sheep		Size of flock	Ratio of ewes to total flock
					Man labor	Feed cost		
	Dol.	*No.*	*Lb.*	*Dol.*	*Hr.*	*Dol.*	*No.*	*Pct.*
11	4.62	82	11.8	0.21	1.7	3.24	39	74
20	4.30	103	13.1	.22	4.2	3.47	40	43
18	4.18	82	9.9	.28	2.1	4.29	106	58
8	3.62	94	6.4	.26	2.0	4.01	81	94
12	3.24	81	11.7	.29	3.5	3.10	39	72
4	2.66	106	6.7	.24	2.4	3.64	48	89
15	2.27	78	8.9	.25	1.6	3.72	67	60
7	1.42	98	12.3	.32	2.2	3.81	79	56
13	1.25	90	8.1	.34	1.8	5.56	33	57
17	.91	45	10.3	.28	2.0	2.41	46	81
6	.69	46	8.4	.34	2.6	3.04	24	80
3	.66	76	7.5	.34	5.6	3.05	33	87
9	.59	57	8.2	.41	6.3	5.87	15	71
1	—.30	33	8.9	.47	2.7	3.73	37	92
Av.	2.42	81	9.4	.29	2.5	3.76	47	70

Some factors affecting profits.—The receipts above net cost per sheep varied from minus 30 cents to plus $4.62 on these 14 farms, as shown in Table 27. These averages were for three and four years on all farms with the exception of Farms 8 and 20, whose records are for two years. The 1920 costs were not averaged in with data presented in Table 27, because of the great difference in cost that year as compared with the other years and because records were not collected from all of these farms in 1920. To make a better comparison of some of the factors that influence the amount of receipts from the sheep enterprise, averages of the years 1921 to 1924, inclusive, were used.

The number of lambs raised per hundred ewes affected the amount of receipts per sheep. Farms 17, 6, 3, 9, and 1, with the lowest number of lambs raised per hundred ewes, had the lowest

receipts per sheep. Farms 4 and 20 raised, as an average, more than one lamb for each ewe at lambing time. Farm 7 raised one or more lambs per ewe two years out of five.

Farms 11, 18, and 20 not only raised a high ratio of lambs to ewes but also sheared heavy fleeces of wool, the combined effect of which resulted in the largest return over and above net cost.

Farm 8 raised fine-wool sheep but sheared very light fleeces. By raising a good ratio of lambs to ewes and selling them off of pasture in the fall without feeding much grain, a good return above net cost was secured.

Farm 4 raised mutton sheep, the wool of which brought a lower price than the finer grades. More than one lamb was raised per ewe, which increased the return above net cost.

Farm 7 kept fine-wool sheep; raised almost a lamb to each ewe; sheared heavy fleeces, but had much smaller return above net cost than others having equal success in raising a high percentage of lambs and obtaining a good clip of wool. Of the average number of sheep in this flock, only 56 percent were ewes. The remaining 44 percent were lambs and yearlings. Lambs were sold in November one year, and during the other four years they were kept as yearlings, fattened, and sold in April and June. The return above net cost per sheep in this flock would not be as great as if the lambs had been sold earlier, because of the increase in the number of sheep. The returns of the flock above net cost were $2.65 when calculated as per ewe instead of per sheep.

Farm 17, with more than 10 pounds of wool per fleece and low feed cost per sheep, received less than a dollar above net cost per sheep, because two ewes were kept for each lamb raised.

Farms 3 and 9 raised mutton sheep and sheared fair weights of wool, but with high labor and feed cost, coupled with a small number of lambs raised in proportion to the ewes, only small returns were secured above net cost.

Farm 1 raised fine-wool sheep, which sheared medium to low weight fleeces, and kept three ewes for each lamb raised. The receipts failed to make returns for all the feed and labor required to maintain this flock under these circumstances.

The combination of good or poor production in both wool and lambs had the greatest effect on the amount of returns above net cost per sheep. These returns were also affected by the requirements of labor and feed. The size of flock affects the labor requirement per sheep. The eight flocks averaging 40 sheep or less in size had an annual labor requirement of 3.3 hours per sheep, as com-

pared to only 2.0 hours per sheep in the larger flocks. The proportion of lambs and yearlings to ewes in the flock, affected the net returns per sheep in some cases. Farms 3, 4, 9, and 13 maintained flocks of mutton sheep. The remaining farms kept fine-wool sheep of various grades. On the average the flocks of fine-wool sheep gave larger returns above net cost than those of mutton sheep.

POULTRY

RETURNS FOR POULTRY AND EGG PRODUCTION

Farm-to-farm variations.—The returns from poultry and eggs exceeded total costs on 17 out of 20 farms for the period records were collected. The range in the amount of returns above total cost was from $123.91 to minus $57.88 per 100 birds, with an average of $30.15, as shown in Table 28.

TABLE 28.—Chickens: Variations in Income, by Farms, 1920-1924

Farm	Received per hour of labor	Returns* per dollar's worth of feed	Annually per 100 birds	
			Labor income	Returns above total cost
	Dol.	*Dol.*	*Dol.*	*Dol.*
10	1.34	7.27	148.59	123.91
2	1.01	3.60	137.89	97.17
8	1.16	5.54	119.62	88.96
20	.60	2.35	112.08	70.46
7	.62	3.70	128.46	67.49
19	.77	5.50	98.79	62.83
18	.71	2.75	99.02	59.95
16	.65	3.84	75.52	42.15
6	.63	2.45	65.92	34.77
1	.55	3.19	56.96	29.81
13	.77	2.57	49.47	29.75
4	.41	2.61	40.19	11.20
15	.28	3.27	38.03	9.77
12	.31	2.76	70.03	7.98
11	.32	2 74	49.65	4.84
17	.33	3.84	53.83	2.10
14	.28	2.39	31.43	.52
5	.16	2.17	25.07	—17.59
3	.14	2.03	38.28	—43.45
9	—.12	1.13	—17.96	—57.88
Average	.48	2.77	73.73	30.15

*Returns include increase in inventory, value of products used by the household, as well as sales less purchases.

When all costs except that of labor were subtracted from the returns, there remained an average of $73.73 as the annual labor income from 100 birds. The range was from $148.59 to minus $17.96.

For the purpose of this study costs and returns are presented per 100 chickens, which means that young chickens have been averaged in with the hens on the basis of feeding capacity. No figures will be presented for hens alone.

The income from the flock is also shown as returns per dollar's worth of feed and the amount received per hour of labor.

Chickens of the heavy breeds made up practically all of these farm flocks. Some flocks received good care and attention while others merely existed. These flocks and conditions are typical of those on many Ohio farms. Some of the factors affecting profits will be presented in the following discussion.

COST OF PRODUCING CHICKENS AND EGGS

Variation in cost of keeping chickens.—The total annual cost of keeping 100 chickens ranged from $72.72 to $218.35, with an average of $134.06, as shown in Table 29.

TABLE 29.—Variations in Annual Cost of Keeping 100 Chickens and Net Cost of Producing Eggs and Chickens, by Farms, 1920-1924

Farm	Average size of flock	Annual cost per 100 fowls								Manure credit	Net cost of eggs and meat per 100 fowls
		Feed	Man labor	Buildings, equipment	Taxes, insurance	Miscellaneous *	Overhead	Interest	Total		
	No.	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*	*Dol.*
10	117	27.04	24.68	7.49	0.74	0.08	8.64	4.05	72.72	5.32	67.40
15	199	25.70	28.16	4.74	.78	1.93	8.36	4.49	74.16	5.90	68.26
13	76	45.46	19.72	10.36	.96	.25	6.00	4.20	86.95	8.25	78.70
8	81	32.18	30.66	10.72	1.30	.....	9.50	5.02	89.38	5.67	83.71
1	132	37.48	27.15	11.98	.69	.11	7.93	4.57	89.91	5.17	84.74
4	159	37.76	28.99	4.93	1.16	1.93	7.54	4.78	87.09	1.84	85.25
19	88	27.67	35.96	5.50	1.19	.....	14.20	4.76	89.28	3.79	85.49
14	179	38.47	30.91	6.49	1.55	3.15	3.80	6.86	91.23	3.08	88.15
16	169	37.98	33.37	16.97	.80	2.70	7.05	4.94	103.81	4.13	99.68
6	119	57.14	31.15	3.91	1.68	4.57	2.08	4.37	104.92	5.21	99.71
5	160	39.83	42.66	6.40	.57	1.61	8.74	4.38	104.19	2.75	101.44
17	132	32.18	51.73	9.67	.76	10.54	13.03	3.44	121.35	4.36	116.99
2	246	62.48	40.72	6.81	.86	5.69	7.11	3.97	127.64	6.25	121.39
11	159	46.18	44.79	21.97	1.03	3.82	5 20	4.77	127.76	6.02	121.74
18	161	70.15	39.07	9.63	1.28	.....	8.36	4.16	132.65	4.97	127.68
7	240	56.47	60.97	4.43	1.87	2.14	10.59	4.88	141.35	3.08	138.27
9	216	114.91	39.92	8.13	1.87	11.18	6.89	4 81	187.71	3.05	184.66
12	125	76.87	62.05	25.65	1.53	15.53	18.43	4.16	204.22	5.12	199.10
20	303	116.63	41.62	13.11	1.49	14.97	9.36	6.02	203.20	3.63	199.57
3	138	86.13	81.73	19.48	.90	7.63	18.67	3.81	218.35	3.24	215.11
Av.	151	59.37	43.58	10.66	1.25	5.00*	9.31	4.89	134.06	4.62	129.44

*Miscellaneous costs consist of an average of $2.56 for purchase of eggs and charges for hatching (cash cost); $1.52 for brooder coal and kerosene, medical and miscellaneous supplies; and $0.92 for horse work.

Feed formed, on the average, 44 percent of the total cost, and was the largest single item. The various kinds of feed used will be presented later. The value of labor formed 33 percent of the total cost. The labor costs, per 100 chickens, varied from $19.72 on Farm 13 to $81.73 on Farm 3. Little or no attempt was made on Farm 13 to produce winter eggs or to raise many young chickens, while Farm 3 tried to produce winter eggs and to raise a larger proportion of young chickens.

On the 20 farms the net cost of producing meat and eggs per 100 chickens, which is found by subtracting manure credit from the total cost, ranged from $67.40 to $215.11, with an average of $129.44. This net cost will be allocated between meat and eggs, and presented later.

Amounts of feed and labor required.—Farms 10, 15, 13, and 8, with the lowest feed costs, fed very little grain other than corn, and only small amounts of other feeds. Their flocks were not large and were given open range. Undoubtedly much subsistance, which was not recorded, was picked up around the feed lots. The labor requirement per 100 chickens was low on these farms, as shown by Table 30. Only a few chickens, in proportion to the size of the laying flock, were raised, which resulted in a small labor requirement.

TABLE 30.—Chickens: Variations in Feed and Labor Requirements per 100 Chickens, by Farms, 1920-1924

Farm*	Total feed cost	Annual requirements per 100 birds								Size of flock
		Corn	Oats	Wheat	Tankage	Bran middlings	Mixed feeds	Skim milk	Man labor	
	Dol.	*Bu.*	*Bu.*	*Bu.*	*Lb.*	*Lb.*	*Lb.*	*Gal.*	*Hr.*	*No.*
10	27.04	25.4	0.6	1.5	9	15	3	184	111	117
15	25.70	30.1	.....	.....	.....	.....	144	.....	107	199
13	45.46	53.5	2.0	5.9	.....	.....	2	111	64	76
8	32.18	34.5	4.7	.5	.....	.....	25	.....	103	81
1	37.48	31.7	20.7	5.1	19	46	61	76	103	132
4	37.76	31.6	62.0	.....	.....	.....	4	.....	97	159
19	27.67	34.2	1.3	.....	.....	.....	1	.....	129	88
14	38.47	30.1	20.0	2.5	60	183	129	.....	112	179
16	37.98	39.8	.....	.....	19	39	100	37	116	169
6	57.14	28.9	1.6	6.2	159	490	219	122	104	119
5	39.83	31.9	25.0	.3	13	32	79	77	159	160
17	32.18	25.3	8.2	3.4	.....	22	212	10	161	132
2	62.48	28.4	34.0	14.5	22	8	53	16	137	246
11	46.18	35.6	8.4	.3	132	245	81	8	153	159
18	70.15	75.9	9.3	7.4	.....	.....	83	119	139	161
7	56.47	32.4	27.2	3.8	57	178	101	215	208	240
9	114.91	96.0	36.2	1.3	23	131	530	131	147	216
12	76.87	49.1	26.3	5.3	80	374	415	61	228	125
20	116.63	28.9	33.5	12.7	319	536	941	340	187	303
3	86.13	37.9	39.0	6.6	164	814	164	297	271	138
Av.	59.37	41.8	23.0	4.7	69.8	171	184	99	155	151

*Farms arranged in order of the efficiency of meat and egg production as shown by the total net cost. The farm with the lowest cost appears at the top of the table.

Farms 7, 9, 12, 20, and 3, with higher feed costs, fed considerable more grain and other feeds per 100 chickens than the first group. Larger flocks were maintained and more attention was given to the poultry enterprise on this group of farms. A much smaller portion of their subsistance was picked up around the feed

lots, as the chickens were often prevented from being present when other stock was fed. A large number of young chickens were raised in proportion to the size of laying flock, which increased the labor requirements.

Average annual cost of keeping 100 chickens.—Corn formed the major portion of the ration fed to chickens. The average amount required was 41.8 bushels per 100 chickens, which was more than 66 percent by weight of the total dry feed fed. Oats was the next most important grain used as poultry feed and made up 17 percent of the dry ration. Corn, oats, and wheat together formed 90 percent of the dry feed given to chickens. Practically all of these grains were grown on the farm on which they were fed.

TABLE 31.—Average Annual Cost of Keeping 100 Chickens and Net Cost of Producing Meat and Eggs on 20 Farms, 1920-1924

Item	Amount	Value	
		Per unit	Total
Cost of keeping 100 chickens a year:		*Dol.*	*Dol.*
Feed			
Corn	41.8 bu.	0.71 per bu.	29.83
Oats	23.0 bu.	.41 per bu.	9.35
Wheat	4.7 bu.	1.14 per bu.	5.34
Taukage	69.8 lb.	3.75 per cwt.	2.62
Bran and middlings	170.8 lb.	2.04 per cwt.	3.48
Mixed feeds	184.2 lb.	3.14 per cwt.	5.79
Skimmilk	99.4 gal.	.03 per gal.	2.96
Total feed cost			59.37
Man labor	155 hrs.	.28 per hr.	43.58
Buildings, equipment			10.66
Taxes, insurance			1.25
Miscellaneous*			5.00
Overhead			9.31
Interest			4.89
Total annual cost			134.06
Credits, manure			4.62
Net cost of meat and eggs			129.44

*Miscellaneous costs consist of an average of $2.56 for the purchase of eggs and charges for hatching (cash cost); $1.52 for brooder coal and kerosene, and medical and miscellaneous supplies; and $0.92 for horse work.

Small amounts of tankage, bran, and middlings were fed. Mixed feeds, as shown in Table 31, represent various prepared poultry feeds purchased usually for the young chickens.

On the average 155 hours of labor was required per 100 chickens. This care and attention was usually given by the housewife or some of the children.

Feed and labor together formed 77 percent of the cost of keeping 100 chickens. The remaining 23 percent of the cost was made up of buildings, equipment, taxes, insurance, overhead, purchase of hatching eggs, cash costs for hatching, brooder coal, kerosene, medical and miscellaneous supplies, horse work and interest.

Current values could be used with the given quantities of feed and labor together with the various other costs to get an average annual cost of keeping 100 chickens.

Costs and returns for eggs.—The returns above cost of producing eggs ranged from 18.4 cents to minus 12.3 cents per dozen on the 20 farms, with an average of 6.1 cents, as shown in Table 32.

TABLE 32.—Eggs: Variations in Cost and Returns as Compared to Volume of Receipts and Period of Year When Eggs Are Usually Highest in Price, by Farms, 1920-1924

Farm	Cost per dollar receipts*	Average annual egg receipts†	Eggs produced in Oct. Nov. Dec. Jan.	Per dozen of eggs		
				Total cost‡	Sale price	Return above cost
	Dol.	*Dol.*	*Pct.*	*Cts.*	*Cts.*	*Cts.*
10	0.35	187.07	12.1	10.0	28.4	18.4
2	.56	257.79	25.0	18.4	33.1	14.7
19	.58	95.60	11.9	19.3	33.4	14.1
8	.49	85.77	7.8	12.8	26.5	13.7
20	.74	404.04	39.1	35.1	47.5	12.4
7	.67	329.08	17.6	20.8	31.0	10.2
16	.70	110.61	9.8	23.5	33.5	10.0
18	.68	228.31	9.4	16.8	24.6	7.8
1	.74	87.58	16.8	21.3	28.8	7.5
13	.73	51.80	10.4	19.6	27.0	7.4
6	.74	118.48	7.4	19.3	26.1	6.8
4	.88	102.26	6.8	27.6	31.4	3.8
15	.87	111.56	8.0	21.0	24.0	3.0
12	.96	192.47	17.4	25.7	26.8	1.1
11	.96	132.70	10.0	29.3	30.4	.9
17	.98	77.07	11.7	30.1	30.6	.5
14	.99	80.72	8.9	23.4	23.6	.2
5	1.21	88.59	13.2	34.3	28.3	—6.0
3	1.25	129.57	20.6	37.2	29.5	—7.7
9	1.47	120.72	12.2	39.3	27.0	—12.3
Av.	.81	143.36	14.8	23.4	29.5	6.1

*Receipts include net increase in inventory, value of produce used by the household, as well as sales of chickens and eggs.

†Receipts include value of eggs used by the household as well as the sales of eggs. This is the average of each flock.

‡The cost of producing eggs was secured by dividing the net cost of producing meat and eggs in the same ratio as were the receipts from these sources.

The variation in returns above cost were caused by time of year eggs were produced, and the sale price received, as well as cost of production. Eggs are usually highest in price during October, November, December, and January. The number of eggs produced during these months varied from 6.8 percent on Farm 4 to 39.1 percent on Farm 20.

The sale price received varied from 47.5 cents on Farm 20 to 23.6 cents per dozen on Farm 14. On Farm 20, with the highest sale price, 39.1 percent of the yearly production of eggs was during the season of high prices while Farm 14 only 8.9 percent was during the same period. The cost to produce eggs during the high priced season was greater, as shown by the cost of 35.1 cents per dozen on Farm 20 as compared with 23.4 cents per dozen on Farm 14.

The cost per dollar of receipts shows the cost of a dollar's worth of chicken, as well as of eggs, when considered on a joint-cost basis. The range in cost per dollar's worth of chickens was from 35 cents to $1.47, with an average on all farms of 81 cents.

The volume of egg receipts may be taken to indicate somewhat the size of business.

TABLE 33.—Chickens: Some Factors Related to the Cost of Egg and Meat Production, by Farms, 1920-1924

Farm	Per 100 fowls				Eggs produced in October, November, December, January	Size of breeding flock	Ratio of hens to total flock
	Returns* above cost	Labor required	Net increase† other than eggs	Eggs			
	Dol.	*Hr.*	*Dol.*	*Doz.*	*Pct.*	*No.*	*Pct.*
10	123.91	111	30.71	565.2	12.1	87	74
2	97.17	137	113.94	316.4	25.0	139	57
8	88.96	103	67.04	398.8	7.8	58	72
20	70.46	187	136.69	280.5	39.1	168	55
7	67.49	208	68.76	441.9	17.6	161	67
19	62.83	129	39.65	325.4	11.9	66	75
18	59.95	139	45.82	575.4	9.4	129	80
16	42.15	116	76.47	194.8	9.8	113	67
6	34.77	104	45.50	381.7	7.4	103	86
1	29.81	103	48.00	230.7	16.8	105	80
13	29.75	64	38.79	253.1	10.4	58	76
4	11.20	97	32.24	205.4	6.8	124	78
15	9.77	107	21.98	233.2	8.0	148	74
12	7.98	228	83.90	444.2	17.4	107	86
11	4.84	153	43.33	273.4	10.0	125	79
17	2.10	161	60.59	190.9	11.7	82	62
14	.52	112	43.51	191.7	8.9	100	56
5	—17.59	159	28.42	195.6	13.2	113	71
3	—43.45	271	77.36	318.8	20.6	78	56
9	—57.88	147	70.95	206.8	12.2	171	79
Av.	30.15	155	64.95	322.1	14.8	115	76

*Returns include increase in inventory, value of products used by the household, as well as sales less purchases.

†This is the amount derived from the sale of birds, value of those used in the household, and increase of inventory.

Some factors affecting profits.—The returns on Farms 2 and 20 were increased by successfully raising a large proportion of young chickens, as shown by the ratio of hens to total flock and net increase in poultry in Table 33. These two farms had among the

smallest ratio of hens to total flock, or, in other words, the largest proportion of young chickens. The largest net increase on poultry other than eggs was secured on these farms.

Farms 14 and 3 had practically the same ratio of hens to total flock as Farms 2 and 20, or they raised about the same proportion of young chickens, but the increase per 100 fowls was considerably less. On Farms 14 and 3 the poultry increase other than eggs was $43.51 and $77.36, respectively, as compared to $113.94 and $136.69 on Farms 2 and 20.

The returns on Farms 2 and 20 were increased by the production of a large percentage of eggs during the season of high prices.

Farm 3 had practically the same production of eggs as Farm 2, with 4.4. percent fewer produced during the high priced season. The total poultry returns on Farm 3 did not cover all assignable costs, while Farm 2 received $97.17 per 100 fowls above costs. The data for these two farms cover the same period of years, 1920-1924. The labor requirement on Farm 3 was almost twice that of Farm 2, while the increase from poultry other than eggs per 100 fowls, was considerably larger on Farm 2. Farm 3 had the smaller breeding flock.

Various combinations of these factors were present on these farms. Farm 18 was considerably above the average in egg production, but the percentage of production during the season of high prices was small, and the increase in poultry other than eggs was also small. The factors were favorable on Farm 7 with the exception of labor, which was above the average requirement. Farm 12 was very similar to Farm 7, except that a greater return was secured from poultry other than eggs in proportion to the number raised. A favorable combination of all of these factors seemed consistently to yield the larger returns.

SUMMARY

A group of farm cost-of-production records supplied excellent data for a study and comparison of the methods and practices of the low-cost livestock producers and the less profitable methods of the high-cost producers.

Feed was the largest cost item in the production of any class of livestock. The change in feed prices caused yearly variations in the cost of producton.

Feed and pasture formed 74.3 percent of the total cost of producing pork. Man labor was the next largest item and formed 11 percent of the total cost.

Corn formed 87 percent by weight of dry feed and 57 percent by value of total cost of producing pork.

Tankage was the principal supplementary feed for hogs.

The total cost of producing a hundred pounds of pork increased as the number of pigs saved per litter decreased.

Each pig in small litters bore a larger share of the breeding herd maintenance and overhead costs than in large litters.

The pigs that live must bear the cost of producing those that die before reaching the marketable age.

The feed cost to produce a weanling pig averaged $2.81.

Costs of producing pork were lowered by raising a large number of healthy pigs per litter, and feeding them properly.

Feed and pasture formed half the gross herd cost of producing butterfat. Man labor formed about a third of the gross cost.

Corn formed 71.5 percent by weight of dry feed consumed by the whole herd.

Cattle received about 60 percent of the total corn stover fed to livestock. The weight of stover fed to cattle was four times that of hay.

The monthly feed cost of calves decreased as the length of time they were kept increased.

Herds of low butterfat producing cows required less feed and man labor but produced butterfat at a higher cost per pound than herds of higher producing cows.

Dual purpose cows produced less butterfat than those of the dairy type. The net herd increase, due to sales and increase in value of young stock, of the dual-purpose herds did not offset the advantage of higher producing cows in the dairy herds.

The production of the cows, as an average on all farms, paid all their expenses and a little more, but the increase in young stock did not pay for all costs connected with their production.

The amount of young stock retained on the farm materially affected the cost of producing butterfat when calculated on the herd basis. The herd cost of producing butterfat was 17 cents more per pound, as an average, on farms that had herds with more than 20 percent young stock than on farms where fewer young stock were kept.

Feed formed 64 percent and man labor about 12 percent of the total cost of keeping a sheep a year.

The annual grain requirement averaged a little over a bushel of corn and a half bushel of oats per sheep.

Flocks of less than 40 sheep required 1.3 hours more of man labor annually per sheep than larger flocks.

An exact cost of wool could not be determined as it was produced jointly with mutton. The average cost of wool and mutton was $5.75 per sheep.

For each dollar's worth of mutton and wool produced, the cost averaged 72 cents.

The farms that had the most receipts above net cost raised 82 to 103 lambs per hundred ewes and sheared heavy fleeces.

The farms that had the least receipts above net cost raised fewer than 70 lambs per hundred ewes and sheared medium to light fleeces.

On the average the flocks of fine-wool sheep gave higher returns above net cost than those of mutton type.

The season in which eggs were produced as well as the number of eggs secured and the success of raising young chicks affected the profits.

Any system by which the cost of a given farm product is reduced has the same effect on the farmer's profit as receiving an increased sale price has when that particular product is marketed.